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METAL INDUSTRY

WITH WHICH ARE INCORPORATED

ALUMINUM WORLD & COPPER AND BRASS

BRASS FOUNDER and FINISHER

ELECTRO-PLATERS REVIEW

Volume 32, Number 1 · JANUARY, 1934 · Two Dollars Per Year

Contents Advertising Page 4 — Publication Office: 116 John Street, New York, N. Y. — Buyers' Guide Advertising Page 35

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- ☐ Cadmium
- ☐ Chromium
- ☐ Copper
- ☐ Die Casting Metal
- ☐ Nickel Silver
- ☐ Silver
- ☐ Steel and Iron
- ☐ Tin
- ☐ Zinc & Soft Metal Alloys

Cleaning BEFORE—

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- ☐ Enameling
- ☐ Japanning
- ☐ Lacquering
- ☐ Vitreous Enameling
- ☐ Pickling
- ☐ Galvanizing
- ☐ Tinning

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- ☐ Washing Painted or Varnished Woodwork
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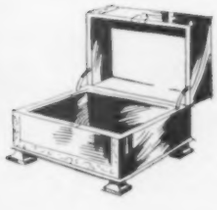

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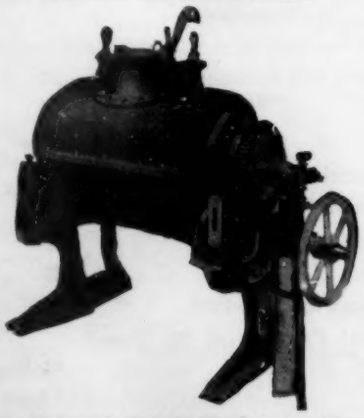

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METAL INDUSTRY

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ELECTRO-PLATERS REVIEW

Vol. 32 NEW YORK, JANUARY, 1934 No. 1

The Metal Industries Under the National Recovery Administration

ONE of the most important topics of discussion and controversy has been the effectiveness or non-effectiveness of the National Industrial Recovery Act as administered by the N.R.A. Opinions have ranged around all the points of the compass.

In order to obtain a fair picture of the situation, **Metal Industry** made a simple survey of its industries. A letter was sent out asking for answers to the following questions:

1. Are you operating at a higher of lower rate since the advent of the N.R.A?
2. Are you employing more or less help since the advent of the N.R.A?
3. Have your profits increased or decreased under the N.R.A?
4. What are your prospects as far as they can be discerned, for the coming year?

These letters were addressed to the heads of the largest and most representative of the different industries in our field. They include brass rolling mills, brass foundries, die casters, silver manufacturers, jobbing electroplaters, ingot manufacturers (smelters and refiners) and equipment and supply houses catering to these industries. Time was insufficient to allow for covering a large number but the companies chosen were among the largest and most representative, and consequently their reports are authoritative.

The concensus of opinion as shown by the tabulation below is fairly clear. The reports are almost unanimous in stating that they are operating at a higher rate since the advent of the N.R.A. They are almost all employing more help. Their records of profits vary widely. The brass mills report increases; the brass foundries, decreases; the die casters decreases; the silver manufacturers, increases; the jobbing electroplaters, the same or slightly more; the ingot manufacturers, less; the supply houses, a little more.

An interesting feature is the opinion expressed by the majority that the prospects were rather good. With few exceptions, the firms quoted are optimistic. A fair summary of the situation was noted in one of the answers which read as follows:

"We are hopeful and optimistic. We do not believe that the N.R.A. has yet had a fair tiral. If the N.R.A. does not succeed in its present form, it is our belief that a better plan than previously had, will be devised. We believe that the year 1934 will be a better year than 1933 because of the natural course of events. We now have four years of depression behind us; that is the big fact."

	Brass Rolling Mills	Brass Foundries	Die Casters	Silver Mfrs.	Electroplaters	Ingot mfrs.	Equip. and Supply houses
Are you operating at a higher or lower rate since the advent of the N.R.A?	Higher	Higher	Higher	Higher	Higher	Lower	Higher
Are you employing more or less help since the advent of the N.R.A.?	More	More	More	More	More	Slightly More	More
Have your profits increased or decreased under the N.R.A.?	Increased	Decreased	Decreased	Increased	Slightly More	Decreased	Small Increase
What are your prospects as far as they can be discerned, for the coming year?	Good	Poor	Business will Increase	Fair	Good	1934 should be better than 1933	Excellent

The Metal Industries

A Symposium on Their Record in 1933 and Prospects for 1934

Copper

By
WILLIAM G. SCHNEIDER

Copper and Brass Research Association

THE copper industry has shared in the improved business conditions throughout the world during 1933. It is to be hoped that the 350,000 tons estimated consumption in 1932 is a record low which will not be broken for a long time to come. In 1933 the consumption was well above this amount; exact tonnage figures are not available. It has been estimated that consumption is now running ahead of mine production by 200,000 tons per year and at this rate is absorbing the offerings of secondary copper and also using up metal from stocks.

During the expansion years, before 1930, a large amount of copper above normal requirements was used by consumers. This excess metal has been to a large extent offset by reduced usage during the past three years of contraction. It has been estimated that 350,000 tons of surplus copper are available over the quantity which would constitute a reasonable normal stock.

The copper industry, because copper does not rapidly deteriorate, suffers from secondary metal perhaps more than other metal industries. With a period of tremendous expansion followed by three years of contraction, it is only natural that the present time is one in which a great deal of scrap metal is offered. The percentage of such scrap as compared to curtailed mine production is very high and apparently we are passing through a period in which the offering of scrap metal is at a peak. It is anticipated that the quantity of available scrap will fall off and return to a normal amount. However, because of the greater tonnage of copper in use, the ensuing years should witness a slowly rising poundage return of such scrap as compared to the amount which would have been a normal quantity say in 1926 or 1927. The scrap situation for copper, and for all other metals, is a complicated one of extreme importance.

It is anticipated that the Copper Producers' code will be signed in the early months of 1934. The Mill Products code has been signed and the new prices issued as of December 11.

The pick-up in the automobile industry, the passing of prohibition, the contemplated Federal building program, the upbuilding of our Navy and other similar developments means greater copper consumption. The return of greater confidence, the fact that stocks on shelves are at a minimum and that shortages of many kinds are building up will sooner or later make itself felt in no unmistakable manner. Our bankers, businessmen and consuming public can then, by keeping their shoulders to the wheel, prevent a retrograde movement.

ZINC

By
JULIAN D. CONOVER

Secretary, American Zinc Institute, Inc.

THE ZINC INDUSTRY in 1933 shared in the general improvement of American business. Deliveries of slab zinc were approximately 345,000 tons as compared with only 218,500 tons in 1932, and stocks in producers hands were reduced from 125,000 tons at the first of the year to 105,000 tons at December 31. The price of the metal, though far below its thirty-year average of 6.54 cents, remained well above the 1932 low of 2.30 cents, and closed the year at 4.35 cents.

The unique merits of zinc as a protection against rusting of iron and steel continued to gain recognition from the consuming public, especially from rural buyers, who use immense quantities of zinc-coated materials. Increasing sales of "Seal of Quality" 2-ounce coated galvanized sheets were reported, largely for the rehabilitation of farm buildings though also for industrial construction, and the matter of heavier-coated galvanized fencing is now receiving intensive consideration from consumers, agricultural leaders, and a number of manufacturers. With the buying power of the farm public apparently on the upgrade after so many years of depression, consumption of zinc in this major use may confidentially be expected to increase.

Better activity in the automobile industry is absorbing substantially larger tonnages of zinc, in the form of parts made from rolled zinc strip (usually chromium-plated), in brass, and in zinc-base die-castings. In the die-casting field outside of the automotive industry, also, zinc is constantly finding new uses, as more and more manufacturers take advantage of the economies and improvements in design made possible by this extremely versatile process.

Not being plagued with large tonnages of scrap or secondary material, such as overhang the market from time to time in the case of other metals, the zinc industry is in excellent position to benefit from increased purchasing power and an upturn in general business.

Tin

By
C. L. MANTELL, Ph.D.

Consulting Chemical Engineer, Pratt Institute, Brooklyn, N. Y.

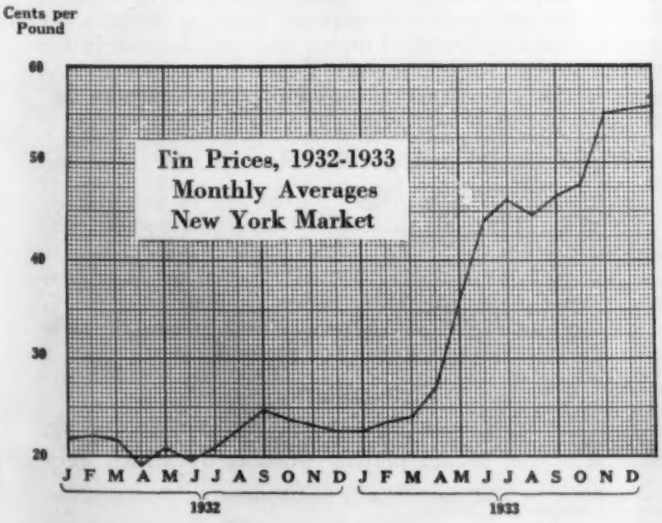
PERHAPS the most important occurrence in connection with tin during the year of 1933 has been the rise of price, as shown in the chart. The price of tin at the end of the year was more than double that at the beginning. This was due to a number of factors, important among which were the American departure from the gold standard and the devaluation of the dollar, the success of the restriction and control schemes in connection with production, and mechanisms for the elimination of surplus. In last year's review, the fact that many tin consumers laid in stocks of low priced metal, almost to the limit of their financial resources, was mentioned. Appreciable portions of these stocks were consumed during the year. With rapidly rising prices of tin, the operation was a very successful one from the financial viewpoint.

During the year the American Tin Trade Association formed a Tin Research and Development Committee with membership including the brokers, consumers, and foreign producers. The Committee set forth as its aims the expansion of present uses of tin, the development of new uses, and the preservation and strengthening of new markets. How effective the Committee will be remains to be seen.

Low automotive production in comparison to boom years showed up in tin consumption. Considerable interest was evidenced during the year in competitive materials for tin, particularly the cadmium alloys, the lead-copper combinations, the bismuth alloys such as those of the cadmium-bismuth-lead type, and the cadmium-nickel alloys for bearing metals where higher speeds and higher temperatures need to be met.

Tin plating prices for 1934 will show a marked advance over the 1933 prices set during the latter part of 1932 when tin was at a low level. With increased tin prices during the year, there came the usual development of competitive metals. Tin plating of cast iron automotive pistons has been maintained as a standard for a very large portion of the automotive output.

The legalization of beer reopened a market for tin pipe and tubing, and the repeal of the Eighteenth Amendment created a demand for pewter and Britannia ware for drinking vessels and articles. A summation statement might be made that political conditions and changes were more marked in their effect on tin prices and consumption during the year than were economic influences.



Aluminum

By
S. K. COLBY

Vice-President, Aluminum Company of America

THE year 1933 will go down in history as a remarkable period. The front pages of our newspapers have carried black headlines announcing a chain of unprecedented events. Economists have alternately jeered and cheered, and watched with frank bewilderment as business battled the rough seas.

Like a sensitive photographic film the diversified aluminum industry has recorded the business events of the year. Competition on the railroads has given us the Union Pacific Railplane—an all-aluminum creation of streamlined design, capable of a speed fast enough to carry it across the continent in less than 50 hours. Two light alloy Pullman cars were exhibited at the World's Fair. New Yorkers will presently ride on an aluminum subway train.

Light alloy extruded shapes have been introduced in the truck body field to further reduce weight and simplify fabrication. Aluminum cylinder heads have been added to aluminum pistons, crankcases, and connecting rods, improving the efficiency of modern high-speed motors.

Beer is back, and in breweries from coast to coast,

aluminum equipment is a topic of conversation. European brewmasters have used aluminum successfully for a score of years. Early indications point to an equally enthusiastic reception for the metal in this country.

In similar vein, repeal has stimulated the bottling industry and aluminum finds a rich market in the form of caps and seals, designed to keep intact the contents of the newly released beverages.

Expanding business has called for new buildings and as in previous years, architects have turned to aluminum in many cases. More than 600,000 lb. of the metal was used in the new Marshall Feld Building in Chicago—most of it for spandrels and windows.

Aluminum furniture sales registered an increase for the year. Light alloy chairs found their way into scores of new places while the aluminum bed has made its appearance. Six hundred of these beds went into a single Eastern hospital.

At Pittsburgh, engineers completed last fall, a remarkable feat. The Smithfield Street Bridge across the Monongahela River was rebuilt, utilizing strong aluminum alloy plate and structural shapes for the entire floor system. The load on the trusses was lightened by 750 tons. A quarter of a century was added to the useful life of the structure.

The outlook for 1934 is promising. Past years have always brought forth a host of new applications for aluminum. It is confidentially expected that in the twelve months ahead the metal will find an even greater sphere of usefulness.

Lead

By

F. E. WORMSER

Secretary, Lead Industries Association

DEVELOPMENT of a patented alloy of lead containing up to 0.1 per cent tellurium is perhaps the most important metallurgical development of the year relating to lead. British investigators claim permanent work-hardening, greater tensile strength, greater resistance to fracture under distortion, higher fatigue limit, greater resistance to corrosion by sulphuric acid and other advantages for this alloy over ordinary lead. Further research on tellurium-lead is being conducted in the United States and the alloy is now on the market here. It is said to be particularly applicable to the manufacture of sheet and pipe.

The past year has seen the production and sale on a comparatively large scale, of flower bowls and holders, candlesticks, picture frames, ash trays, book ends and other ornamental objects made of lead, demonstrating the suitability of lead for interior decoration in addition to architectural and garden ornamentation for which it has been used so long.

Architecturally, ornamental lead bay windows are now being produced in a pre-fabricated form with selection of design from a large number of patterns which may be used in combination to yield practically individual designs. This makes these windows available in a much lower price field than formerly.

Oil and grease, containing finely divided metallic lead, is now on the market. It is to be used for the same purpose as greases containing lead soaps, which have been marketed for some time.

An electric oar, powered by an ordinary lead-acid automobile storage battery, has been placed on the market to propel rowboats, canoes and as emergency power for sailboats. It has the advantage of simplicity and silent operation.

Nickel and Its Alloys

By ROBERT C. STANLEY

President, The International Nickel Company of Canada, Limited.*

ANALYSIS of the nickel market for 1933 discloses that it has apparently benefited from the recent years of depression. Whereas we all have quite properly attributed the falling off in production of commodities to curtailment in world trade, we are coming only now to appreciate the profound changes which the depression has wrought in the industrial attitude towards better materials, better performance and lower ultimate costs.

In this search for better products, nickel in combination with iron and steel and with nonferrous metals as well, has come to be a common denominator of the move towards alloys. Thus a metal which once was dependent on armaments for its market and which later won a great market in the post-war expansion of automobile production, now is enjoying increasingly diversified commercial applications.

World consumption of nickel in all forms for the first ten months of 1933 was 77,609,280 pounds, as compared with slightly more than 49,500,000 pounds in the same period of 1932 and with the 112,481,600 pounds of the same part of the peak year, 1929.

How important a new field the repeal of prohibition in the United States will develop for nickel will be known better after another twelve months. Experience during the first year of the legalization of beer has shown that the American brewer is tending to follow the trends in Canada and Europe towards the use of pure nickel and of nickel alloy equipment in the manufacture, shipment and dispensing of beer. As that trend is also increasing among the vintners and distillers of other nations.

Pure Nickel

Pure nickel for **coinage** is growing in popularity.

In **radio tube** manufacture the consumption was approximately twice that of last year. Nickel is also sharing in the expanding use of vacuum tubes of new and varied types for many other applications.

Expanding facilities for production of **caustic soda** have created new business for nickel.

Nickel Plating

During the year commercial production was expanded of the nickel plating process by which very

* An abstract of The Nickel Industry in 1933 issued by the International Nickel Company of Canada.

bright deposits may be plated rapidly and to relatively great thickness. When this is done over well polished metal, final buffing is practically eliminated with consequent reduction in overall costs.

Outdoor exposure tests were continued this year under the joint auspices of the American Electroplaters' Society and the American Society for Testing Materials. These tests indicate that no plated coating of less than .001 inches in thickness will protect a steel base under severe conditions of exposure. In marine locations a solid nickel coating, alone or under a chromium finishing layer, is more protective than a coating of equal thickness but consisting of separate layers of nickel and other metals. In France the several railway systems are adopting standard specifications for nickel plating.

The improvement in methods of electroplating and the official recognition of the efficiency of heavier plating are two developments which indicate that even in nickel plating, one of the oldest commercial applications of this metal, the market for nickel can expand.

Monel Metal

(Approximately 67% Nickel)

The outstanding development in the domestic field has been the acceptance given to monel metal hot water tanks, range boilers and storage tanks for automatic gas and electric hot water heaters in the home.

Monel metal has been adopted for important structural parts of seaplanes, which are exposed to the action of salt water; also for such parts as gate and valve equipment for **Madden Dam** and **Boulder Dam.** Due to improvements in mill practice, it has been possible to furnish this material in large shafts with a minimum breaking strength of 90,000 lbs./sq. in., a minimum yield point of 70,000 lbs./sq. in., elongation in two inches of 20% to 30%, and a reduction in area of 20% to 50%.

Inconel
(80% Nickel)

Introduced two years ago as Inco Chrome Nickel, primarily for dairy equipment, Inconel has already found important applications in a dozen other fields. Its most recent form of commercial production is as **Inconel-clad** steel. Other uses are for surface heating units in electric stoves, wire for window screens, exhaust manifolds of aircraft engines, as material for springs, mixing and storage tanks for gin, table flatware and low priced costume jewelry.

Solid Nickel Silvers

(5%—30% Nickel)

The decolorizing power of nickel in copper alloys has been known and appreciated for many years. During the past year a special effort has been made to take advantage of the many delicate colors and unique tints available in the transition towards whiteness. The color range includes many pastel shades of pink, tan, salmon, lemon, green, blue and purple. Being "solid" and not merely superficial, these effects are of more than ordinary interest to architects and designers of ornamental metal work. For the first time in the history of alloying metals, these colors have been correlated with the alloy compositions, and charts are being prepared for easy reference by architects.

Thus, while many castings of nickel silver for architectural trim, plumbing fixtures and certain classes of food handling equipment will continue to be made to government specifications (20% Ni), a wide gamut in color, hardness and melting point can be obtained by appropriate changes in the composition of the alloy. At the same time extruded sections of complicated shapes are now being produced in several grades of nickel silver, some 2,000 different shapes being available.

Nickel in Other Alloys

A copper-nickel-tin bronze, containing approximately 8% nickel, has been developed at the Bayonne Research Laboratory. It is responsive to heat treatment and, remaining tough, develops an elastic limit of some 55,000 lbs./sq. in. The copper-lead bearing alloys frequently contain a small amount of nickel properly to disperse the lead. A bearing metal consisting of cadmium hardened by the addition of approximately 2% of nickel has been devised recently.

Platinum

By CHARLES ENGELHARD

President, Baker & Company, Ltd., Newark, N. J.

THE year 1933 proved a significant year in the World Platinum Market, because for the first time in its history platinum and the metals of the Platinum Group became active competitors of gold in the Arts and Industries.

Gold, as expressed in depreciated currencies, became higher and higher in price, and as a consequence the attention of the Arts and Industries was more and more attracted to platinum and the metals of the Platinum Group, because some of these platinum metals have special advantages which make them even superior to gold for certain purposes.

There are three heavy platinum metals, viz: Platinum, Iridium and Osmium, and three light platinum group metals, viz: Palladium, Rhodium and Ruthenium.

The two principal discoveries of the last forty years are "Nitrate out of the Air" and "Artificial Silk", and both these discoveries find their backbone in the employment of reasonable priced platinum and platinum-rhodium.

The introduction of platinum, palladium and rhodium plating, as originated by Baker & Co., Inc., Newark, N. J., and covered by many patents is destined to have an ever increasing influence in the art of plating, on account of its non-tarnishing features, its nobility and principally its reasonable cost.

There is no industry in the world which has suffered more during the past three years than the Jewelry Industry, and it is gratifying to note that the attention of jewelers has been called to the platinum group metal "Palladium", which has only about half the specific gravity of gold, and which is sold at present at about two-thirds the price of gold, and which is bound to become a great and effective replacer of ten, twelve and fourteen karat white gold.

There are, to my mind, at present, great possibilities to help the Government to preserve gold and to help the industries, particularly the jewelry industry, to take advantage of the great possibilities of Platinum, Palladium, Rhodium, Iridium, Ruthenium and Osmium, at the present unsurpassed popular prices.

Gold and Silver

By

G. H. NIEMEYER

Vice-president, Handy & Harman, New York

GOLD

WE estimate that considerably less gold was used in the arts and industry during 1933 than was used during 1932. While no figures are available, we should say that $20,000,000 worth of gold would be a liberal estimate. This compares with consumption of $50,000,000 to $60,000,000 in a normal year. All branches of the industry, and particularly the manufacturer of jewelry, were hard hit.

It is of interest to record a change in the gold price. The statutory price of $20.67 per oz. of fine gold had remained unchanged for about 60 years (established by the Act of Feb. 12, 1873). Prior to March 6th, 1933, gold bullion was available without restriction at this statutory rate. Following the President's Bank Holiday Proclamation on March 6th, no gold was available until March 13th, on which date the Secretary of the Treasury authorized the Federal Reserve Banks to sell gold bullion for legitimate and customary trade uses, and while there were restrictions on the purchase, the price remained unchanged until August 28th, after which date it was necessary to procure a license to acquire the metal.

On August 29th, the President issued Executive Orders which completely changed the situation, and provided that the Government would accept newly mined gold of American origin at the Mints and Assay Offices to be sold abroad or to domestic users in the Arts and Industries at a daily price which was to be equal to the best rate obtainable in the free gold markets of the world. On Sept. 8th, the first rate of $29.62 per troy oz. was quoted, and these quotations fluctuated between $29.00 and $32.28 per oz. until October 25th, when the President issued an Executive Order authorizing the Reconstruction Finance Corporation to purchase newly mined American gold and to buy or sell gold in the world market.

Under the new arrangement, no gold was available for industrial purposes through any Government agency after October 27th, although secondary gold could be sold to the Government at the rate of $20.67 per oz. Under these circumstances, refiners and dealers in the precious metals assumed the responsibility of supplying gold to the arts and industries, and since that time (and, in fact, since August 28th) the price of secondary gold has fluctuated with supply and demand. Beginning August 28th, secondary gold prices were approximately the same as the Government rates for newly mined gold, but as supplies began to exceed the demand, the secondary prices dropped considerably and toward the end of the year were far below Government rates. The closing price for the year was $26.75, having fluctuated between $26.00 and $31.80 per troy oz.

Silver

We estimate the world production of silver during 1933 at approximately 163,000,000 ozs., which is just about what it was during 1932. The United States produced 21,400,000 ozs.; Mexico 69,100,000 ozs., Canada 15,400,000 ozs. The production figures for the United States and Mexico show a reduction of about 2,000,000 ozs. under 1932, and Canada about 3,000,000 ozs. less than the year before.

We estimate the consumption of silver for industrial purposes at approximately 24,000,000 ozs., which shows an increase of about 10% over 1932. As usual more silver went into silverware than into any other industry. The ounce sales of sterling silver flatware showed an increase of from 15 to 18%. Sterling silver hollow ware ounce sales were about what they were the year before. Silver plated ware used between 18 and 20% more silver than it did in 1932. The chemical industry, which includes photographic film, showed an increase of about 15% over the year before in ounce consumption, and while there was a decline in the use of silver for jewelry and dental alloys, there was an increase in the use of silver for industrial purposes such as chemical equipment and, to a greater extent, special alloys such as silver solders. Special research along these lines has developed brazing mixtures which are revolutionizing some of the accepted practices in this field.

The highest New York Official price during 1933 was 45c on November 14th and 16th; the lowest 24½c on Jan. 3rd, and the average for the year 34.727c.

Secondary Metals

By THOMAS A. WRIGHT

Secretary and Technical Director, Lucius Pitkin, Inc., Chemists, New York

THE outstanding events of the year in secondaries are economic in character. Technical advances, at least so far as published comment or data is concerned, have been those that affect an individual concern rather than industry at large. Volume again was affected by the general apathy of business. An exception was secondary gold and, incidentally, associated metals. Here the monetary policy of the government as evidenced in the various treasury orders was instrumental in a marked increase in scrap of comparatively high karat value.

The influence of governmental policy was quite

obviously extended through code negotiations to scrap. The major effects are still to come. A realignment of scrap interests is proceeding. The National Association of Waste Material Dealers is now that in fact as well as in name, code necessities having resulted in the virtual withdrawal from membership of the custom smelter and large industrial concerns formerly so active. Some smelters and refiners processing secondary precious metals at present come under the code for manufacturing jewelers.

As usual secondary copper held the center of the stage and as usual when the price of refined metal showed a tendency to rise, shipments to the refineries increased in volume but dried up quickly when the price weakened. Exporters have had a difficult time.

The primary producers are still reluctant to face the facts as evidenced by the prolonged and to date still unsuccessful negotiations on a code for the copper industry. Something more than a resentful attitude towards scrap copper is needed to put the industry on a firm basis that will insure legitimate profits to producer of primary, producer of scrap, consumer of both, and the legitimate scrap dealer.

The ranks of the custom smelters have been increased by the entrance of The Raritan Copper Works, a subsidiary to Anaconda, although purchases in the main have been confined to refinery grades.

Zinc, aluminum, synthetic resins and stainless or chromium plated steel still are making inroads which cut even normal production of copper scrap.

In a short review, lead, tin and antimony must be considered as a group. Battery lead has been stagnant. Auto-wrecking continues at a low rate, thus affecting the available tonnage of radiators for sweating, which while low would be still lower if it were not from the low consumption of non-ferrous ingot. Some mixtures of red and white can still be handled at a more attractive refining charge abroad.

Radio and other nickel scrap, zinc and aluminum require no special comment. The reviews of 1934 and 1935 will probably require much more comment.

The Brass Foundry

By

H. M. ST. JOHN

Associate Editor

THE brass foundry industry has made little technical progress during 1933. There have been few, if any, developments worthy of note. During the first one or two years of the business depression there was a tendency toward the adoption of improved equipment and methods of control previously developed but not in general use. This trend has come to a standstill because of a discouraging condition which the industry finds itself compelled to face.

For many years sand-cast brass held its place because of its easy machinability, pleasing appearance, and its ability to withstand ordinary types of corrosion. For the past three or four years it has been losing ground steadily to materials which, because of lower per pound cost or lower processing costs, can be made up more cheaply into sufficiently satisfactory articles of commerce. Zinc-base die castings, brass forgings, stampings of various sorts and iron castings have each taken their toll. Even non-metallic substances, such as bakelite, have occasionally been substituted for brass. With the exception of iron castings, it is characteristic of all of these substitutes that they are formed in a long-lived mould or die to practically finished shape and dimensions so that machining costs are largely eliminated. Many of them resist corrosion about as well as brass, while others use a protective coating of some sort. Most of them are stronger as well as cheaper than sand-cast brass.

There are some articles, as, for example, valve bodies, which cannot readily be made in permanent moulds. Although such examples are few, they are made in large volume and, for the present at least, sand-cast brass continues to be the preferred material. The sand-casting process is also cheapest when only a few pieces of any one kind or shape are desired, since permanent moulds are expensive and must be used thousands of times to be economical. For this reason the sand foundry still produces a great variety of castings of widely varying shape and size, each made in small volume. But all of these items taken together and totalled make up only a fraction of the business formerly enjoyed by the brass foundry. Nor can there be any assurance that cheaper methods will not supplant sand casting for the production of valve bodies, plumbing goods and the like.

In order to hold its own, and possibly regain some of its lost territory, cast brass must improve its economy. Brass castings, comparable in strength with wrought brass, must be made to finished shape and size. When this can be done the inherently desirable properties of brass will work strongly in its favor. Gravity casting and pressure casting, in metal moulds, seem the most promising methods. The development of a mould which will stand the relatively high pouring temperatures and corrosive action of brass is the serious problem. The aluminum foundry has gone over very largely to gravity casting. For aluminum and its alloys the mould problem is less difficult and has been solved. In certain special cases the gravity casting of bearing bronze has been successfully accomplished.

For general application the most promising development has been a European process in which semi-fluid brass is pressed into a metal mould under high mechanical pressure. Admittedly the necessary equipment is rather expensive and not entirely out of the experimental stage.

An important factor in the progress of the aluminum foundry has been the development of strong alloys, particularly those which can be strengthened by heat treatment. The iron foundry has also regained much lost ground by producing cast iron with properties far surpassing those of a few years ago. It has been rather taken for granted that the brasses and bronzes are not capable of such development. But who knows? Surely the cast iron of ten years ago was an ugly duckling with few swanlike features.

The Brass Rolling Mills

BY WILLIAM J. PETTIS

Associate Editor

THE non-ferrous rolling mills, in common with all the manufacturing in the country whose products must first pass through a fabricating process by other manufacturers, who, in their turn, are dependent on the development of new business, such as building, mechanical equipment, electrical development, etc., for any quantity demand, have had little incentive to plan for increased production or installing new equipment.

Most of the new ideas have been in the direction of reducing the cost of production by the refinement of existing practices, and adoption of ingenious ideas in processing, rather than large capital outlays for new machinery.

Among the new developments is the continuous casting of brass, twelve inches to eighteen inches in width, three sixteenth of an inch in thickness. The surface is almost as good as rolled brass, and is rolled as cast.

There is also a new method of making seamless copper and brass tubes. The process is to "squeeze" them instead of drawing.

Quality is now being stressed as never before, as under the New Deal of "Fair Practice" this will be the selling feature, and not price.

The forty hour week seems to be favored in places where it was condemned at first, as more manufacturers realize that the mill's capacity for the production of sheets, strips, etc, is in excess of any demand it can vision, even under a strong come-back of business.

Plating and Finishing

By DR. A. K. GRAHAM

Associate Editor

IN THE short space of 15 years the plating industry has witnessed sweeping changes and remarkable developments. Large scale automatic plating, continuous plating operations, technically trained operators, chemical control of solutions, vastly improved standards for plating supplies and finishes and new metals yielding to electrodeposition are but the most conspicuous resulting from the demands of the automobile manufacturer and a period of tremendous research activity.

The depression has retarded but has not stopped this advance in plating. Limitations may be placed upon the industry by the enactment of certain emergency measures by the Federal government in the effort to increase employment the extent of which may not be clearly defined at the moment, but experience has proven that such limitations serve to stimulate increased economies in plant operations. Research programs may be curtailed in the desire of the manufacturer to reduce plant overhead, but with competition yielding to the equalizing effect of business codes it is all the more certain that research must be continued. A premium is thus placed upon the most efficient operation for the sake of economy, and upon the improvement of products, in order successfully to meet competition. Further advances are therefore confidentially expected.

Without attempting to cover in detail all the accomplishments of the past year in plating, one may mention a study of the composition of cyanide zinc plating baths (Tran. Electrochm. Soc. v. 63, p. 121, 1933), and an investigation of nickel solutions (Tran. Far. Soc. v. 29, July 1933) as offering much that is new. The organization of the Tin Research and Development Council in England is expected to result in certain contributions on the electrodeposition of that metal which will be most welcome.

Jewelry Making

By C. M. HOKE

Consulting Chemist, the Jewelers Technical Advice Company, New York

THE rising price of gold, and the popular desire to dispose of old jewelry, have led many people to turn in outmoded trinkets for cash or for new goods; this has brought welcome activity to an industry that has suffered several lean years.

The rise in the price of gold will also return yellow gold to its place in the sun of Fashion. We may look for truly yellow alloys—the buttery yellow of fine gold—and the massive designs that go with it.

Other old friends to return after a long absence are the chatelaine watch—possibly as a result of Mrs. Roosevelt's fondness for a certain long-ago gift from the President—and the tiara, now on display in every department store.

Platinum, of course, will still be chosen for highest grade jewelry, especially where diamonds are employed, but the low karat white golds, and chromium-plated novelties, will be definitely less popular.

The whimsicalities of Fashion display themselves in charms and in mechanical tricks. By charms we mean pendants or bangles in the shape of dogs, rabbits, Mickey and Minnie Mouse, and whatnot. Some are quite handsome, and enamel is used freely. Many are comical, but others are as sentimental as a valentine.

But it is in the mechanical tricks that our Yankee love for gadgets has burst into full flower. A necklace will break up into a bracelet and two clips. A lip-stick is also a watch. A ring will, at a touch, transform itself into a totally different ring. Brooches break down into clips; clips add themselves together to form a lorgnette. Presto-changeo! is the word!

The industry expects a good 1934, partly because of the interest in gold, partly because money, when it appears, will want to spend itself on something tangible.

Necrology

AMONG the men of prominence in the metal industries who passed away during 1933 were the following.

Milton L. Lissberger, President, Marks Lissberger and Son, Inc., Long Island City, N. Y.

Harry T. Cross, Treasurer, Thinsheet Metals Company, Waterbury, Conn.

Harry B. Dow, Assistant Secretary, Waterbury Clock Company, Waterbury, Conn.

John F. Staab, Superintendent, Edwardsville Brass Works, Edwardsville, Ill.

Charles Vickers, Consulting Metallurgical Engineer, Buffalo, New York.

Benjamin B. Thayer, Vice-President, Anaconda Copper Mining Company, New York.

Ramon P. Lopez, formerly National Vice-President, American Electroplaters' Society, Rochester, N. Y.

John D. Ryan, Chairman, Board of Directors, Anaconda Copper Mining Company, New York.

F. W. Reidenbach, Rochester, N. Y. Formerly President, National Association of Waste Material Dealers.

L. Wenk, Vice-President, U. S. Reduction Company, East Chicago, Ind.

George J. Almendinger, President, Buckeye Brass and Manufacturing Company, Cleveland, Ohio.

Prosper Clust, Dieges and Clust, New York City.

Leopold Plaut, Chairman, Board of Directors, Black and Boyd Manufacturing Company, New York.

LeRoy Seidell, President, New York Testing Laboratories, New York City.

Mason T. Adams, Vice-President and General Manager, Seth Thomas Clock Company, Thomaston, Conn.

Richard J. Findlan, Secretary and Treasurer, Aluminum Goods Manufacturing Company, Manitowoc, Wis.

Thomas J. Shallue, formerly Superintendent, Sheet Rolling Mill, Bridgeport Brass Company, Bridgeport, Conn.

Henry F. Seifert, Superintendent of Foundries, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

Gerard Wayland-Smith, Vice-President, Oneida Community, Ltd., Oneida, N. Y.

David Belais, manufacturer of white gold, New York.

Herbert L. Lord, Vice-President and Treasurer, Detroit Lubricator Company, Detroit, Mich.

Robert H. Taylor, President, Yerges Manufacturing Company, Fremont, Ohio.

Elijah W. Hodge, President, Hodge Manufacturing Company, Greenville, Pa.

Fred J. Liscomb, Consulting Electroplating Engineer, Chicago, Ill.

Charles H. Buchanan, Pioneer salesman of electroplating supplies, Hinsdale, Mass.

Frank Greenwald, formerly President, Cleveland Branch and Chicago Branch, American Electroplaters' Society.

William H. Grubb, Controller, International Nickel Company of Canada, Ltd., New York.

J. Howard Muzzy, Chairman, Board of Directors, Federal-Mogul Corporation, Detroit, Mich.

Harry C. Flanigan, Lacquer Sales Manager, Ault and Wiborg Corporation, New York.

August F. Schoen, President, National Sherardizing and Machine Company, Hartford, Conn.

John T. Stoney, formerly President, Stoney Foundry Engineering and Equipment Company, Cleveland, Ohio.

William T. Timmons, President, Electroplaters and Stereotypers Association, New York.

Frank A. Wallace, President, R. Wallace and Sons, Wallingford, Conn.

William T. Elkinton, Chairman, Board of Directors, Philadelphia Quartz Company, Philadelphia, Pa.

Richard B. Mellon, formerly President, Pittsburgh Reduction Company, now Aluminum Company of America, Pittsburgh, Pa.

George Vits, President, Aluminum Goods Manufacturing Company, Manitowoc, Wis.

Russell H. Colby, President, Aurora Metal Company, Aurora, Ill.

Isaac W. Cokefair, Vice-President, International Silver Company, Meriden, Conn.

F. A. Russ, formerly President, Bassett Metal Goods Company, Shelton, Conn.

T. D. Lynch, Consulting Metallurgical Engineer, Westinghouse Electric and Manufacturing Company, E. Pittsburgh, Pa.

P. R. Diamond, Chairman of the Board, Canadian Bronze Company, Montreal, Canada.

George Krouse, Brass Founder, Jersey City, N. J.

William Shaw, Sr., foundryman, Newark, N. J.

Everett Morss, President, Simplex Wire and Cable Company, Boston, Mass.

Willis R. King, Hanson-Van Winkle-Munning Company, Matawan, N. J.

Arthur Sehfert, Foreman Electroplater, Winchester Repeating Arms Company, New Haven, Conn.

Edward L. Ashley, veteran brass mill engineer and former mechanical superintendent of Scovill Manufacturing Company, Waterbury, Conn.

Practical Brass Foundry Costs

By THOMAS H. WILLIAMS

President, E. A. Williams & Son, Inc. (Brass Founders), Jersey City, N. J.

A Simple, Practical Method of Cost Fixing and Estimating For the Jobbing Brass Foundry

IT IS well known that the jobbing brass foundry industry is in a bad condition. It depends for its existence on other industries. It rises and falls with those industries. It has been, for years, subjected to the attack of other processes—die casting, permanent mold casting and slush casting. And last—and most important—it is afflicted with the worst of all business ills—**unintelligent competition.**

What is unintelligent competition? It can be defined in a few words. It is **unknowingly selling below cost.**

Sometimes a small sale below cost may be good business. It may have advertising value. It may be "thrown in" as a favor to an old customer with a lot of profitable work. But it should be done knowingly—with eyes wide open. The loss should be calculated and the gains resulting from such a sale should be checked against the loss.

Unknowingly selling below cost is the result of only one thing—ignorance; ignorance of all the elements that go into the making of a casting. Perhaps this ignorance may be caused by carelessness in keeping records; perhaps by careless estimating, "snap" judgment or ill-considered guesses instead of careful estimates. Whatever the reason, the effect is always the same. **Unintelligent competition drives prices down throughout the industry and forces everyone to work at a loss.**

In order to help cure this evil the Metropolitan Brass Founders Association has developed a **simple** cost system; a system which can be operated with the minimum of expense; which calls for no accountants to keep up. It demands only care on the part of the owner.

Fixed Cost or Overhead

The first question to clear up is how to divide the expenses of a foundry. The method developed separates them into two general classes:

1. Direct Labor—Molders
   Indirect Labor—Coremaking and Cleaning.
2. Fixed Cost—All other labor and all other expenses.

By using only these two classifications, all expenses can be easily calculated in terms of the molder's time—so many dollars per hour of molding time. This cost system is based on the assumption that the sole purpose of every expense and every employee is to serve the molder. Therefore the molder and the molder alone must produce the income for the foundry. Such a system reduces cost keeping to its simplest terms.

The following is a fairly complete list of the items that make up the General Operating Expense:

Monthly General Operating Expense

Melters	Unskilled Labor
Foundry Labor (not cleaners)	
Watchmen or Detective Service	
Coal	Fuel and Power
Coke	
Oil	
Gas	
Power	
	Crucibles
Buildings	Repairs
Furnaces	
Machinery	
Sand (Mold & Core)	Supplies
Partings	
Core Oil	
Core Wire & Rods	
Core Plates	
Fire Sand	
Fire Clay	
Flux	
Plumago	
Fire Brick	
Nails	
Gaggers	
Molasses	
Sea Coal	
General Pattern Repairs	
Flour	
Lubricants	
Waste	
Air Hose Fittings	
Clamps	
Shovels	
Riddles	
Brushes	
Lumber	
Rammers	
Tools	
Grinding Wheels	
Blasting Abrasive	
Driver's Salary	Cartage
Helper's Salary	
Gas and Oil	
Repairs	
Tires	

Selling Expense

Advertising	
Salesmen's Salary and Expense	
Commissions	
Carfare, R.R., etc.	Traveling
Use of Car	
Gas, Oil and Maintenance	

Administrative Expense

Officers	Salaries
Director's Fees	
Office	
Superintendent	
Foreman	
Shipping Clerk	
Telephone	Expense
Telegrams	
Postage	
Printing	
Stationery	
Repairs to Off. Equipment	
Dues to Association	
Legal Expenses	
Auditing	
Traveling (not salesmen)	

Fixed Expense

Real Estate, Equipment, Capital	Taxes
Real Estate, Equipment, Compensation, Burglary, Auto Trucks, Automobile, Pub. Liability	Insurance
Building, Equipment, Auto Trucks, Automobiles	Depreciation
Bonds, Notes	Interest
	Rent
	Pensions
	Sales Tax
	Income Tax
Monthly Overhead	Total

The next step is to ascertain the number of molding days that have been employed by the plant. This is done by adding up all of the hours put in by all of the molders of the plant during the month, and dividing this total by the number of hours that constitute a working day. For example—if there were 800 hours molding time and the plant was working on an 8 hour day, the 800 hours would be divided by 8 hours, and the plant would have worked 100 molding days. The monthly overhead total is now divided by the number of molding days, which gives the average overhead per molder per molding day.

Of course there are always variations in the working force and in the expenses. It is best to take an average from the previous year's figures.

Overhead on Molding Day Basis

Year 1932	Total overhead	Molding Days	Overhead per Molder's Day
January	$3000.00	150	$20.00
February	2660.00	140	19.00
March	3780.00	180	21.00
April	2535.00	130	19.50
May	2520.00	140	18.00
June	3400.00	200	17.00
July	3150.00	175	18.00
August	2860.00	110	26.00
September	3045.00	105	29.00
October	2220.00	120	18.50
November	2090.00	110	19.00
December	2440.00	125	19.52
Total for year	$33,700.00	Total for year 1685	Average per month $20.00

At the end of the first month of the new year, add in the months totals and subtract the first month of the preceding year, for the working figures. In other words, use the last twelve months for the most up-to-date calculation of overhead.

For 12 months Ending January 31st, 1933

(Subtract) Jan. 1932	3,000.00	(subtract)	150	
	$30,700.00		1535	
(Add) Jan. 1933	3,635.00	(add)	100	36.25
Total for 12 months ending Jan. 31, 1933	$34,335.00	(divide)	1635=Average per month	21.00

For 12 months Ending Feb. 28, 1933

(Subtract) Feb. 1933	2,660.00	(subtract)	140	
	$31,675.00		1495	
(Add) Feb. 1933	2,150.00	(plus)	155	13.87
Total for 12 months ending Feb. 28, 1933	$33,825.00	(divide)	1650=Average per month	20.50

The above method of calculation is necessary to get a true picture because the Overhead per Molder's Day may vary so widely from month to month (depending upon the amount of work which has been in the shop; the more work, the more molding days and the lower the Overhead; the less work, the less molding days and the higher the Overhead). Note that in January, 1933, work is scarce, there are only 100 molding days, some heavy payments had to be made and the Overhead jumped to $36.25, while in February, 1933, work increased to 140 molding days, no special payments had to be made and Overhead fell to $13.87.

Estimating a Job

Let us take a possible job and make out an estimate on the basis described. Below is a form.

Customer	Date	
Address	.....Copper at	.....
Job	.....Tin at	.....
.....	.....Lead at	.....
.....	.....Zinc at	.....
.....	.....Aluminum at	.....
.....	.....	.....
.....	.....	.....
Mold size	Molding	Gross Metal Cost ...
Cstgs. per mold ...	Core Making	% Melting Loss ....
Wgt. per cstg.	Cleaning	Metal cost per lb. ...
Wgt. per mold	Fixed Cost	Mfg. cost per lb. ...
Molds per day	Extra Labor	Net cost .....
Gross lbs. per day ..		
Loss	.....	Profit .....
Net lbs. per day ..	Mfg. Cost	Selling Price .....

Suppose a customer—The Jones Company—asks for an estimate on a lot of bushings, weighing ten lbs. each; metal to be phosphor bronze (80 parts of Copper, 10 parts of Tin, 10 parts of Lead.) Two of the bushings will fit into a 12" x 18" mold. Copper is selling at 8c per lb., Tin at 50c, Lead at 5c. Two lbs. of phosphor copper will have to be used at 25c per lb. The rates of pay prevailing are: molders and coremakers, 75c per hour or $6.00 per day; cleaners, 50c per hour or $4.00 per day.

The estimator judges that a molder can turn out 12 molds per day or 24 castings, with the gross weight of 240 lbs., from which he deducts an estimated loss of 5%, making net production for the day 228 lbs.

He estimates further that it will take the coremaker 1½ hours to make these 24 cores at an expense of $1.12, and that it will take the cleaner 3 hours to clean the 24 castings at an expense of $1.50. Hence, the card will be filled out like the schedule below.

Customer: Jones Co., Jonesville, Ky. March 8, 1934.
Job:

.....	78	Copper	@	8	6.24
.....	78	Tin	@	50	5.00
.....	10	Lead	@	5	50
.... Bushings—XYZ		Zinc			
.....		Aluminum			
.....	2	15% phos cop.	@	25	50

Mold Size 12x18	Net Lbs. per day 228	Gr. Metal Cost	12.24
Cstgs. per mold 2	Molding 6.00	% Melting Loss	6-.73
Wgt. per cstg 10 lbs.	CoreMaking 1.12[1]	Metal cost/lb.	12.97
Wgt. per mold 20 lbs.	Cleaning 1.50[2]	Mfg. cost/lb.	12.77[3]
Molds per day 12 est.	Fixed Cost 20.50	Net cost	25.74
Gr. Lbs. per day 240	Extra Labor	Profit	2.57
Loss (5% est.) 12 lbs.	Mfg. Cost 29.12	Selling Price	28.31

[1]Estimated as follows: 1½ hrs. @ 75c hr. equals $1.12.
[2]Estimated as follows: 3 hrs @ 50 c equals $1.50.
[3]Manufacturing Cost (29.12) equals 12.77
Net lbs. per day (288)

It is believed that the above system is simple enough to be operated by anyone, and accurate enough to ensure a profit—if it is lived up to.

Job Platers Have National Organization

Master Electro-Platers Institute Meets in Cleveland, Ohio, December 15-16, 1933 to Complete National Unity. Plans Laid for Supplemental Code and Effective Code Authority

THE Master Electro-Platers Institute held a special meeting in Cleveland, Ohio, December 15th-16th, 1933 at the Cleveland Hotel. About fifty members from twenty different cities were present.

The first meeting was called to order on December 15th at one o'clock by **James Gerity, Jr.**, of Toledo, President. **Mr. Gerity** outlined the purpose of the meeting which consisted of organizing the job plating shops of the United States under one head and the amalgamation of the various local groups into one national organization. The headquarters address is R. J. Nagel, Secretary-Treasurer, 3835 Beiss Ave., Toledo, Ohio.

Reports from Local Organizations

Mr. Jensen reported that Chicago had forty-five members, out of a total of ninety shops, already paid into the Institute. **Mr. Price,** the attorney for the Chicago group, presented some of his experiences in working with the National Recovery Administration. According to the N. R. A., business and the Government are in partnership. Business contributes short hours and increased wages. Government contributes the abrogation of the existing anti-trust laws, thus making it possible to fix fair prices. There is consequently the chance for Industry to do something for itself under Government control.

Mr. Bregman reported that the group in New York were hard at work on a plan for equitable methods of competition among its members. A great deal of effort had been expended on estimating methods and cost systems and the group had settled on methods of estimating for work which involved (1) polishing and plating in small lots; (2) ball burnishing (no wheel polishing) and plating; (3) barrel plating; (4) production work on chromium, nickel and straight polishing only. These figures are to be used to substantiate prices which will be set at a later date, under the provisions in the Code against doing work below reasonable cost.

Mr. Booth of Detroit reported that members of his organization were now submitting monthly reports of labor rates and also putting out jobbing price lists. They are cooperating on credits by listing delinquent accounts. Employers are dealing with shop representatives among their employees. There is an excellent spirit of cooperation throughout this district.

Mr. Sutro reported for the Metropolitan Master Platers Association, with members largely in Brooklyn. He suggested assessing every member of the Master Platers Institute to create a treasury and also submitting a Code as fast as possible to Washington, which would protect the job plater against the unfair competition of manufacturers who are paying polishers below the rates paid by job shops.

Mr. Steuernagel of Milwaukee reported that his city was organized 100% in the Master Platers Institute and that it should be the general effort to get everyone into the national organization.

Mr. Joseph reported for New England. Worcester, Mass. has already appointed a Referee with power to act among the job plating plants. Other cities in Massachusetts have organized collectively and have formed a Master Platers Institute of New England, which, however, does not yet include Boston, but it is hoped that this city will join soon. New England will support the national organization.

Mr. Musick of St. Louis reported that there are twenty job platers in his city, but that only ten of them attend meetings and the rest are awaiting developments. He intended to go back and organize them completely because plans are definitely set for a national organization.

Mr. Kloose of Cincinnati stated that only nine of the fifteen shops of his city had joined as the platers are very conservative. He suggested a provision in the Code for setting the wage rates paid by manufacturers in their plating plants at the same level as in the job shops.

Mr. MacDowell reported that Indiana was well organized and would support the national organization.

Mr. Leland of Dayton, Ohio, reported good progress. They are worried about competition in nearby cities. They want data on cost accounting, but he recommended getting to work on a Code as fast as possible and then going on to other projects.

Miss McCalley of Indiana urged early attention to cost accounting methods.

Mr. Cole of Canton, Ohio, reported full sympathy with the objects of the Master Electro-Platers Institute. He urged a Code provided with teeth which could be enforced among all platers, even those who would not join the Institute.

Mr. Hale of Toledo reported an excellent spirit of cooperation. He asked that the Code include special provisions for the hard chrome plating industry which does little or no polishing.

Mr. Gerity of Toledo, reported that supply houses are cooperating with the Institute by being careful of their credits among job platers who are unsound.

Mr. Mayers of Frederic B. Stevens, Inc., of Detroit, explained the terms which are being set by the buffing composition manufacturers. Credit arrangements are more stringent than formerly. Contracts are limited to three months. A uniform cost accounting system is being used to justify prices which are being set.

Organization Committee Meeting

The general meeting adjourned at 4 p.m. to allow for a meeting of an Organization Committee which

was composed of one or two representatives from each city. At this meeting **Mr. Jensen** of Chicago was elected temporary chairman and **Mr. Nagle** of Toledo, secretary of the Master Electro-Platers Institute, was elected temporary secretary. The following measures were approved for recommendation to the membership as a whole.

1. The name of the National organization remains The Master Electro-Platers Institute.
2. The present officers are to remain in office until the next annual meeting, with the addition of the election of a third vice-president.
3. All delegates at this meeting were to return to their local groups with a report of this meeting. These local groups would then select a representative to serve on the Board of Governors of the national body to act with the other Governors in the conduct of all necessary business, and also the selection and remuneration of an Executive Secretary for the national body.

General Meeting

The general meeting of all the members re-convened at 7 p.m. The recommendations of the Organization Committee, as given above, were accepted.

Upon an explanation of the straitened financial condition of the Institute, the members present made voluntary contributions individually and by groups, as payments to be credited to their accounts in lieu of future dues. A total of $1,000 was pledged.

The members also pledged the undertaking of an active drive for new members in every locality.

Mr. Bregman of New York described and explained in detail the methods developed by the Chromium Platers Guild for estimating on the following classes of work:

1. Polishing and plating in small lots.
2. Ball burnishing (no wheel polishing) and plating.
3. Barrel plating.
4. Production plating (large quantities) of chromium or nickel.
5. Straight polishing only.

Mr. Sievering of New York described a chart by which he had, in his firm, proved the advisability of eliminating the work which showed a loss and retaining only the business which could be done at a profit. He cited a concrete example in which a shop with total sales of about $9,000 per month showed a profit of $175 per month before eliminating the unprofitable work. After revising prices the total sales of this shop were only $5,600 per month, but the profit was $750.

Operation of the Fabricated Metals Federation

The meeting on the morning of December 16th was devoted to a talk by **Mr. D. S. Hunter** of the Executive Committee of the Fabricated Metals Federation. Mr. Hunter explained the inception of this Federation. Federal Deputy Administrator King found that he had before him almost 200 codes to judge, and that each Code was taking from one to three days time for hearings, discussions, etc. In order to avoid delay he brought them all together into a Fabricated Metals Code, this Code including also Metal Coating.

He explained why it was better to file a Supplemental Code rather than to attempt a separate Code for the electro-plating industry. A Supplemental Code would not require public hearings; it would not necessitate the presence of labor representatives. It would accept the present labor provisions and include only trade practices. It would cover the elimination of unfair practices and also a description of the fair practices which were to be followed. The electro-plating industry could have its own Code Authority and it would have, in addition, the backing of the Fabricated Metals Code Authority.

The Master Electro-Platers Institute, in order to obtain recognition for its Supplemental Code, must have in its membership a majority of the Industry. The word "majority" is flexible, however. For example, forty per cent of the number of shops doing eighty per cent of the total business would be considered a majority. But eighty per cent of the members, doing only thirty-five per cent of the total business, are not a majority.

Every Plater Now Under Fabricated Metals Code

Mr. Hunter pointed out that since November 12th 1933, every electro-plater in the United States, whether or not he had signed the President's Re-employment Agreement, whether or not he was a member of the Master Electro-Platers Institute or any other trade organization, whether he was doing intra-state or inter-state business, was bound by the Fabricated Metals Code and all its wage and hour provisions.

Labor Provisions

As regards labor provisions, there is nothing in the Fabricated Metals Code which requires the employer and the employee to come to any agreement. The employer must bargain with any representatives—union or non-union—whom his employees choose, but **he is not bound to come to any agreement with them.** If a majority of any class of employees choose a representative, that representative is legally entitled to a hearing from the employer for his employees as a whole. This representative may be an outsider, union business agent or not. The employer must recognize him and bargain. He can, however, legally refuse to come to any definite agreement with him which does not satisfy him, and **he can also refuse to arbitrate.**

Mr. Hunter recommended that this situation be handled tactfully, however. The wise employer would deal diplomatically with his men and come to a fair agreement. If this turned out to be impossible, he could hire other employees as he saw fit. **Mr. Hunter** also advised employers against taking the initiative in dealing with trade unions. He suggested the careful and tactful organization of shop committees, feeling that fair dealing by the employer with his own employees directly, would eliminate the need for outside representatives.

Concerning wage rates, the main provisions in the Code are that the minimum rate is forty cents per hour for males in the Northern wage district, thirty-five cents for females; thirty-five cents for males in the Southern wage district and thirty cents for females—with the provision, however, that where females are doing the same work under the same conditions as males, their wage rates are to be the same. Special exceptions are allowed, but these are few in number.

The "equitable adjustments" for higher classes of labor were explained. Starting with May 1, 1933, if a

common laborer had been raised from twenty-five cents to forty cents per hour, all other labor, semi-skilled and skilled, should be raised the same amount —that is, fifteen cents per hour. In other words, all labor should be raised the same amount in cents per hour.

Mr. Hunter pointed out that the adjustments in wage rates described above would be necessary only if they had not already been made before November 12th. If polishers had already received the same increase in cents per hour as unskilled labor, no further adjustment was necessary. Piece work rates must be adjusted to provide workers with the hourly rates given above.

Shop workers, since they are not paid for holidays, may work additional time during the same week to make up for the lost time, up to a total of forty hours. Office employees, however, since they are generally paid for holidays, cannot work the additional time without being debited with that time. Employees may work over the forty hours per week, provided that such hours do not total more than thirty-two in a six months period, without extra payment for overtime. If they are required to work more than this extra thirty-two hours, they are to be paid time and a half for such overtime work.

Supplemental Code Provisions and Enforcement

The enforcement of the Code will be carried on by territorial and local groups. The Code Authorities will be the Authority of the Fabricated Metals Federation and the Authority of the Master Electro-Platers Institute. The territorial groups will be represented on the Authority of the Master Electro-Platers Institute, just as the Master Electro-Platers Institute will be represented on the Authority of the Fabricated Metals Federation.

The Master Electro-Platers Institute Code could include a provision that manufacturers with plating departments must pay their labor the same as job shops; in other words, wage rates in electroplating plants should be the same throughout, in all plants doing plating for their own use or for sale.

If a complaint is registered with the Fabricated Metals Federation, this Federation would report it to the Master Electro-Platers Institute Code Authority. The Institute would cause an examination to be made of the records and then if the complaint was justified, order the guilty firm to stop its unfair practice. If this order were not complied with, the case could be turned over to the local District Attorney for criminal proceedings.

The Master Electro-Platers Institute would be altogether autonomous. There is no danger of its being over-ridden by the Fabricated Metals Federation. By being a part of this Federation, however, it would have the advantage of the backing of the larger and stronger body.

Provisions can be included in the Code for the prevention of selling below reasonable cost. A formula must be provided, however, which is satisfactory to the Administrator. As soon as it is approved by him it becomes the Law and must be adhered to by all shops, **even if they are not members of the Institute.**

No definite amount has yet been set for the dues to the Fabricated Metals Federation. It has, however, a considerable staff to support. It has a Legal Department to advise its members. It has a Trade Association Department to help local and divisional secretaries in serving their members. It is estimated that the cost will be from 25 cents to 40 cents per employee per year.

Any Supplemental Code which is put in, must abide by the present wage and hour rates set by the Fabricated Metals Code. It was Mr. Hunter's opinion that owners of businesses without employees (doing all the work themselves) could be limited by the terms of the Code.

Some Codes have been written which include a clause that for one year no member shall increase his capacity, nor shall any new shops be opened. It was Mr. Hunter's opinion, however, that it would be difficult to get an Administrator to approve such a clause and even more difficult to enforce it. There can be no limit set to the territory in which a firm may solicit business.

Board of Governors to Meet January 19-20

At the meeting on the afternoon of December 16th, with Vice-president E. J. Musick of St. Louis, presiding, it was decided that the Board of Governers of the Master Electro-Platers Institute should meet in Cleveland, Ohio, on January 19th and 20th. At this meeting the Board will transact the following business:

1. Submit a plan dividing the United States into districts, reorganizing the Institute in such fashion that all the member firms in each district will unite on one representative on the Board of Governors.
2. Appoint the following committees:
   a. Collecting data on wages and hours for the various classes of labor in plating jobs.
   b. Open prices on various standard types of work.
   c. Fair trade practices.
   d. Collecting data for establishing reasonable cost figures below which shops may not work.
3. The individual Governors, representing their localities, are to bring with them suggestions which are to be taken into consideration in formulating a Supplemental Code for the Master Electro-Platers Institute.
4. The Master Electro-Platers Institute is to stay under the Fabricated Metals Federation.
5. The Board of Governors will make use of the Legal Department and counsel of the Fabricated Metals Federation to which they are entitled as members, and hire additional counsel only if necessary.

The members tendered rising votes of thanks to Mr. Hunter who had given them such a clear explanation of the code and to Messrs. Gerity and Nagel for their tireless efforts on behalf of the Master Electro-Platers Institute. The meetings closed on Saturday, December 16th at 4.30 p.m.

The Non-Ferrous Foundry Code Approved

The code for non-ferrous foundries, submitted by The Non-Ferrous Foundry Association for Industrial Recovery was signed by the President on Monday, December 18, 1933.

Details of this code will be published as soon as copies are available from the Government Printing Office.

Brass Ingot Code Approved

Word has been received of the signing of the Code for the brass ingot industry (secondary refining) according to a report from Washington.

Filtration of Plating Solutions

By LOUIS WEISBERG and WILLARD F. GREENWALD
Weisberg & Greenwald, Inc., Chemical Engineers, New York City

A Discussion of the Factors Involved. The Need for Filtration, Types of Filters, Materials of Construction, Pumps and Other Considerations

The Need for Filtering

THE growing importance of filtration in connection with electroplating operations arises from the use of higher current densities, higher rates of deposition and thicker deposits. In the older and slower practice, dirt in the solution had ample opportunity to settle to the bottom of the plating tank, leaving the solution reasonably clean and free from dirt, with the exception of surface dust. But with the new standards of plating, thicker deposits are required, and good thick deposits cannot be obtained unless plating solutions are kept free from suspended dirt particles.

In the case of unagitated solutions every plater has had the experience at one time or another of taking work out of the tank and finding the upper surfaces rough while the under surfaces were perfectly smooth. This invariably happens when the solution contains suspended dirt particles which settle on the upper surfaces and become embedded in the deposit. Any one who has tried to buff such plated work knows that it is not possible to produce a good finish under such conditions.

Dirt like this can be recognized with the naked eye. More treacherous is the presence in a deposit of dirt which is too fine and too well distributed to be seen without the help of a microscope. This condition may arise when the solution is agitated but not properly filtered. Dirt inclusions thus may vary over a wide range, all the way from deposits that are superficially smooth to those that are rough to the touch. Although there is considerable variation between these extremes, it is useless to expect good service, from the standpoint of either corrosion or wear, from deposits containing dirt. Every dirt particle represents a potential pin-hole. In buffing, many such particles are torn out. It is evident that a deposit which contains dirt will not give as good wear as one that is free from inclusions.

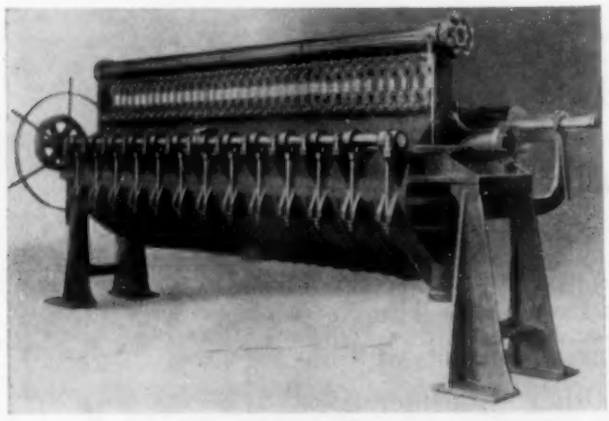
No plater would think of putting work into the plating tank without taking pains to see that the work was properly cleaned first, except in a few special cases where the plating solution itself does the cleaning. The importance of cleaning is a part of the plater's religion. What is the use of going to all this trouble to remove dirt in the first place if the plating solution itself is so dirty that it can put dirt back on the work? Logically, therefore, filtration of plating solutions is simply an extension of accepted ideas regarding the importance of absolute cleanliness in all plating work.

Factors to Be Considered

Filtration of plating solutions involves a number of considerations. First, comes the type of filter to be used. Of what materials shall it be made? What rate of filtration shall be employed? What size of filter and what kind of pump can be used? There is no general answer which covers all cases. Different solutions require different materials while different operating conditions require different rates. One type of filtering equipment might prove economical in a large plant but be prohibitive in first cost for a smaller plant. So many points require consideration that every individual filtration job presents specific problems. A good many platers have tried homemade filters, or filters not suitable for the job, and given up in disgust. This shows how important it is to get the right filter in each case. It is only recently that much thought has been given to the proper design and selection of filters for use with plating solutions.

Types of Filters

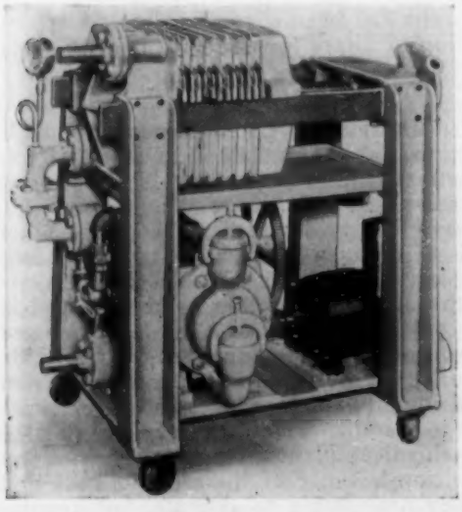
Many types of filters are in common use for chemical work—suction filters, pressure leaf type filters, plate and frame filter presses, centrifugals, continuous drum and continuous leaf filters. The choice for plating solutions narrows down to a few. The chief consideration is to produce clarification of the plating solution at the lowest cost and with the least investment. Since the amount of solids to be removed is comparatively small, some of the more expensive types which are economically justified in certain kinds of chemical work may be ruled out of consideration. Generally speaking, the plate and frame filter press is the cheapest to install. Thousands of filter presses are in use in chemical plants, where they have an established position because of their ruggedness and reliability. They are simple to operate, but require a little more time for cleaning than the best leaf types. Where cleaning is required only occasionally, as in most plating plants, this slight disadvantage is more than off-set by the low first cost. The plate and frame filter press is built up of alternate plates and frames mounted on a framework and locked together. This is often spoken of as the flush plate and frame pattern to distinguish it from another type in which the chambers are formed by recessed plates without frames. In the flush plate and frame type the filter cloths lay flat and are subject to less wear at the margin than in the recessed plate type where the cloths do not lay flat. The recessed plate type is some times slightly less expensive, but the difference



Sweetland Pressure Filter, Leaf Type, Showing the Vertical Sight Glasses, Made by Oliver-United Filters, Inc., New York.

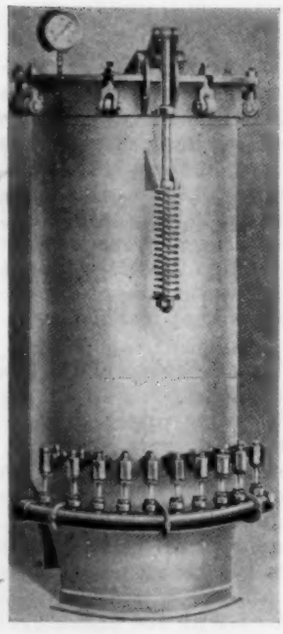
in cost between this and the flush plate and frame type is not usually enough to be important so far as filters for plating are concerned.

In the case of plating solutions, the amount of solids to be taken out is usually small and this should be reflected in the design. The cake capacity, by which is meant the volume of filtered solids which the press can hold, should be low in proportion to the filter area. In the plate and frame type of filter press, the cake capacity is varied by varying the thickness of the frames; in the recessed plate type by the depth of the recess. It is not desirable to go too far in reducing cake capacity, since a larger cake capacity permits the press to be operated for a longer time without cleaning. Cakes ranging from one-half inch to one inch thick are about the right thickness for plating work. In this connection, it must be recognized that the amount of solids to be handled must depend to a considerable degree on the particular solution that is being handled. A high pH nickel solution produces considerably more sludge than a low pH solution; so a filter that is perfectly suitable for the low pH solution might prove a constant annoyance if used on a high pH solution. From the standpoint of sludge to be handled, the acid copper solution comes near to the low pH solution.



Portable Unit Consisting of Flush Type Plate and Frame Filter Press, Diaphragm Pump, Strainer, Pressure Gauge, and By-pass Piping, made by T. Shriver and Company, Harrison, N. J.

Leaf type filters can be designed so that the labor of unloading and cleaning them is considerably less than for a plate and frame press. Against this is the fact that they generally cost more. It is true that there are some leaf filters on the market that cost less than a good filter press, but these unfortunately are not the ones that are so easy to clean. If a leaf filter is to be used at all, it should be one of the better ones. Otherwise a filter press is preferable. It is questionable in plating work whether the extra first cost of the high grade leaf filter is worth while in view of the comparatively small amount of solids to be handled. Unquestionably though there is a field for a moderate-priced leaf filter easier to clean than the filter press.



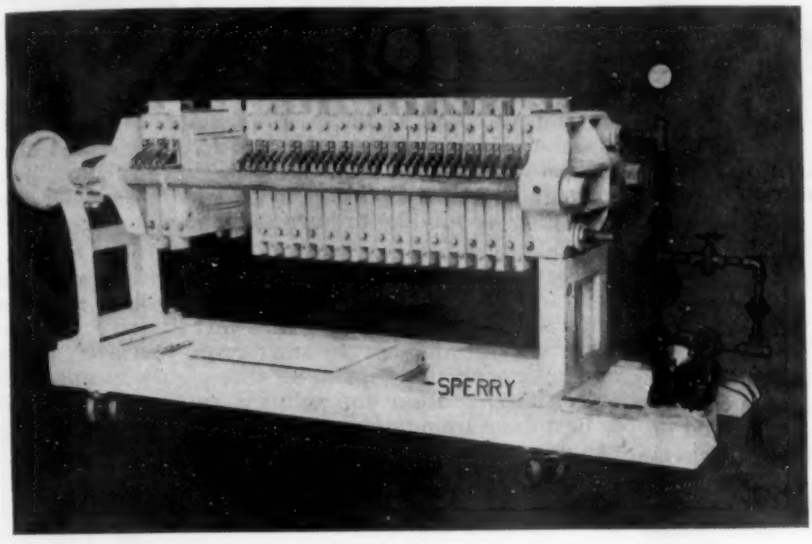
A New Type of Leaf Filter Now Being Introduced by Oliver-United Filters, Inc., New York.

Of the remaining type of filters only the centrifugal has been tried to any extent in connection with plating solutions. The applicability of the centrifugal is limited by its small cake capacity and high first cost. A centrifugal, with a new unloading feature which has recently come on the market, represents a considerable improvement with respect to unloading. The centrifugal gives exceptionally good clarification, but its first cost is an obstacle to its general adoption.

Materials for Filter Construction

The type of filter for a given job having been decided upon, it becomes necessary to consider of what materials it shall be constructed. We are concerned not alone with the effect of the plating solution on the materials used in the filter, but with the effect of these materials on the solution. Obviously the materials of which the filter is constructed must stand up in contact with the solutions to be handled. This though is not enough, for it does not exclude a slight

attack that may be harmful to the solution. Some bronzes, for example, seem to stand up well against hot nickel solutions, but it is not safe to accept any particular bronze for this service until it has been established that it does not put into solution traces of copper sufficient to cause darkening of the deposit and other familiar troubles. Iron obviously cannot be used with acid copper solutions, since copper would deposit on it in loose spongy form and iron would go into solution.



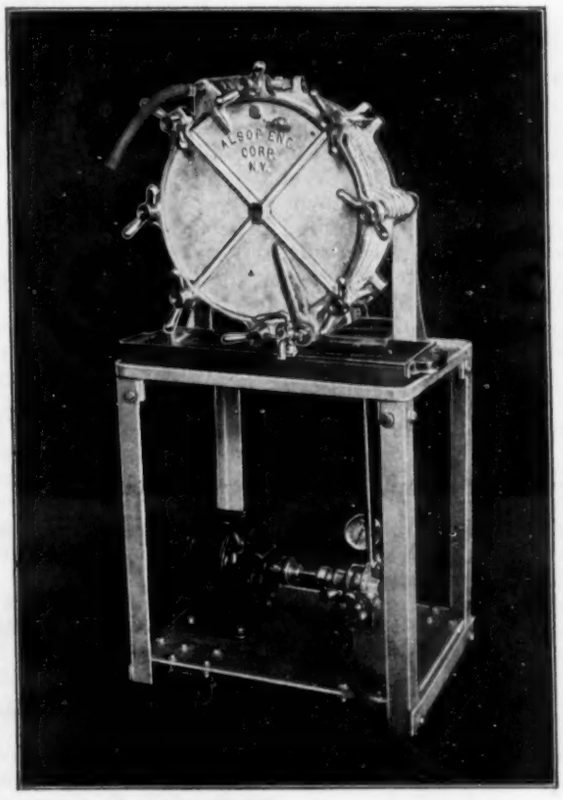
Portable Unit Consisting of Flush Type Plate and Frame Filter Press, Rotary Pump, Pressure Gauge, and By-pass Piping, Made by D. R. Sperry & Company, Batavia, Ill.

Lead, rubber and certain bronzes are the most serviceable materials for hot nickel and acid copper solutions. Solid nickel filter presses (for hot nickel solutions) can be had at a lower cost than might be expected. The use of lead and rubber lined plating tanks is familiar to most platers, and these are the most obvious materials to turn to for filter construction. For filter presses, which we believe will find most general use, rubber can be used in two ways. The press may be made of iron and covered with rubber, or it may be made of a molded rubber compound, the only metal parts being the bars and heads which are rubber covered. This latter type of filter press is an excellent unit for many plating solutions and is quite reasonable in cost. Rubber filter presses of this type cost less than a lead press and about the same as a press made of wood.

Choosing the Right Pump

After the filter has been selected, the real difficulty must be faced, which is to find a suitable pump without spending more money for the pump than for the filter. In strictly chemical work, that is not an unusual situation, and more difficulty is experienced with this question than with any other phase of the problem of providing filter equipment for plating solutions. A positive displacement type of pump is to be preferred; this usually means a piston pump (like the triplex pump), a rotary, or a diaphragm pump. The last named is an ideal pump for filter press work, but is expensive. Centrifugal pumps are not so good because the efficiency drops off as the pressure rises, which it must do towards the end of the filtration cycle. Accordingly, as the pressure increases centrifugal pumps require more and more power to maintain the same rate of flow. Where this type of pump is used, the cake thickness should be kept below one-half inch so as to work at the lowest pressure possible. This is practical only when the percentage of solids is very small.

Pumps made of materials that are satisfactory for



Portable Unit Consisting of Asbestos Disc Filter (a Modified Type of Plate and Frame Filter Press), Rotary Pump, Strainer, Pressure Gauge, and By-pass Piping, Made by Alsop Engineering Co., New York.

handling plating solutions cost considerably more than ordinary iron pumps, and consequently there is often a tendency to select a pump on the basis of first cost without giving proper weight to other factors. A more expensive pump may prove cheapest in the long run; so consideration should be given to operating costs as well as first cost.

On the whole, rubber or rubber lined pumps are to be preferred whenever they can be used. They resist acid copper and nickel solutions well, though for hot nickel solutions it is imperative that a sufficiently heat-resisting compound be selected. This applies particularly to the solid rubber pump. Rubber rotary pumps are available at moderate prices.

Nothing has been said so far about cyanide plating solutions since iron or steel equipment may be used for these, with the exception of solutions of silver and the noble metals.

Capacity of Equipment

How fast must a solution be filtered in order to keep it clean? Obviously the answer depends on a number of factors, such as the volume of solution, amount of sludge, circulation of solution, and speed of plating. To give a general answer to cover all cases is therefore impossible, but this much can be said. As the size of a filtration unit increases, the cost per unit of filtering area goes down. It costs relatively little more to provide ample capacity to take care of any emergency; so choosing an under-sized filter is poor economy. It is advisable to have capacity enough to pass a volume equal to the total volume of solution through the filter in several hours at most. When the filter is operated continuously, a lower rate is adequate than if it is operated intermittently. A smaller filter therefore will keep the solution clean if it is operated continuously. Not only is there a saving in first cost through continuous operation, but usually better clarification and more uniform conditions can be obtained by following this practice.

In figuring the capacity of a filter, it is important to recognize that the capacity when the filter is first started up may be much greater than after it has been running a while, and especially after the filter approaches the point where it needs to be cleaned. The starting rate may be as high as 50 gallons per square foot of filter area per hour. This drops to perhaps 25 or 30 gallons per square foot per hour as a cake is formed and continues to drop further as the thickness of the cake increases. When the rate drops much below 10 gallons per square foot per hour, it is better to clean the filter and start over again. With the proper cake capacity, it should not be necessary to shut a filter down for cleaning oftener than once a week, except in large plants, where a shorter cycle may be desirable. After gaining some experience, an operator should be able to clean an ordinary size press in not more than one-half hour.

It is evident from what has been said above that it is better to rate filters in terms of filtering area rather than in gallons per hour. Most plating solution filters on the market are rated in gallons per hour. Unless the conditions are exactly set forth, this rating is meaningless. For ordinary purposes, it is safe to figure on an **average** rate of about 20 or 25 gallons per square foot of filtering area per hour. The pump must be of suitable capacity to give this average rate.

The filter should be provided with a strainer to keep out large objects that may damage the pump or clog the channels. Breakage of filter plates is almost invariably due to a clogged channel, or in other words, to the failure to provide a strainer. The filter should also be provided with a pressure relief valve, and a by-pass connection to permit excess solution to flow back to the tank. To get the maximum rate of filtration, the pressure should be built up gradually. Full pressure at the beginning produces a compact cake which presents extra resistance and slows up the filtration during the rest of the cycle.

It is worth while to use a motor of generous size on the pump to avoid overheating or burning out. Another thing to remember is that buying a filter does no good unless the filter is run. It should be kept going so that plating solutions are as clean and sparkling as you like to have the water you drink.

In plants which have a number of solutions to filter, a separate filter for each solution is desirable, but in some cases it is necessary to use the same filter on different solutions to keep the investment in equipment within bounds. In such cases the filter, pump and all connections must be thoroughly cleaned before changing from one solution to the other. This is best done by pumping water through all parts long enough to flush out the last trace of solution.

Agitation Is Necessary

Finally, it is a waste of money to install and operate a filter unless the solution is agitated so that the dirt is picked up and carried into the filter. Leaving part of the dirt on the bottom of the tank or in the corners nullifies the good that the filter can do.

Operating Costs

The cost of operating a filter naturally varies with its size. Small filters do not cost more than twenty-five to fifty cents per day to operate. This includes not only labor and power but all other costs such as repair and maintenance, interest on investment, and depreciation. Records on a press with an average capacity of 8,000 gallons per hour show a total daily cost of less than $3.00. Any plating plant can afford an additional cost of this amount in return for even a slight improvement in quality. When account is taken of the very significant improvement in quality which can be obtained through the use of filtered plating solutions, the saving in buffing costs, the reduction in rejects and the greater speed of plating that bcomes possible, investment in filtration equipment can be recommended as one of the essentials of a well-ordered and economically run plating plant.

While this article has dealt solely with filtration, it may not be out of place to say that necessary and desirable as filtration has come to be, it alone will not cure all troubles or insure good work. It is a step in the right direction—an essential step—but with it must go proper control of plating solutions based on regular chemical analyses, the right choice of plating conditions, such as temperature and current density, adequate cleaning and preparation before plating, suitable racking and the use of deposits thick enough to give protection for the service required. None of these alone can insure good plating. All of them are necessary. Most important of all though is the plater, for even the best equipment will not give good results unless it is used with intelligence. The intelligent plater will use filtration because it helps to produce better work and keeps costs down.

A Calendar of Events of Importance to the Metal Industries

1933

JANUARY

Gold—$20.67 per oz.; sales without restriction.

Silver—25¾c. per oz. (average).

Supreme Court denies writ against United Chromium, Inc., in patent case.

FEBRUARY

Bank "holidays" in Michigan, Indiana, Maryland, Arkansas and Ohio.

Institute of Metals Division Meeting.

MARCH

Roosevelt inaugurated as President of the United States.

All banks closed.

Most banks re-opened.

APRIL

United States goes off the gold standard.

3.2% beer legalized.

Business index rising.

Copper price rises first time since December 1932, touching 6½c.

MAY

Century of Progress Exposition in Chicago opens.

Business index still rising.

Copper up to 7¾c.

Electrochemical Society Meeting.

Du Pont acquires Remington Arms.

JUNE

National Industrial Recovery Act passed.

Business index still rising.

Conventions and meetings held by American Foundrymen's Association, American Electroplaters' Society, American Society for Testing Materials.

Master Electro-Platers' Institute formed.

Copper goes to 8c. Silver at 35c.

JULY

Business index, near 98, is highest since 1930.

International Economic Conference breaks down.

Copper and Brass Mill Products Association formed.

Connecticut brass mills raise wages 7½ to 10 per cent.

Fabricated Metal Products Federation formed.

Nonferrous Foundry Assn. formed.

Secondary Metals Institute formed.

AUGUST

Business index declines.

Copper touches 9c.

Silver remains above 35c.

Industries busy writing codes under N.R.A.

SEPTEMBER

Treasury begins to issue daily gold price, and to buy newly mined gold.

Business index drops again.

Hearings begun in suit of United Chromium, Inc., vs. General Motors. (Decision to be rendered sometime after March 15, 1934.)

Electrochemical Society meets.

OCTOBER

R. F. C. begins purchase of gold in open market at increasing prices.

Business index lower.

General Electric's third quarter orders 72% above same 1932 period.

Copper down to 7½c.

National Metal Congress.

NOVEMBER

Business index at 73, lowest since May.

Russia is recognized.

Century of Progress closes, to re-open in 1934.

Fabricated Metal Products and Metal Coating Code signed.

Copper and Brass Mill Products Code signed.

DECEMBER

18th Amendment Repealed.

Business index rising.

Government announces silver buying policy; metal goes to 44⅝c. in open market.

Non-Ferrous Foundry Code signed.

Brass Ingot Code signed.

Copper price averages over 8c.

Meeting of Master Electro-Platers' Institute, at Cleveland, Ohio.

Review of 1933—Prospects for 1934

THE latter part of 1932 was a period of hope and rising activity. It seemed that the depression had run its course like a disease, and that the patient was beginning to recover. Then suddenly, shortly after the beginning of the year, we were assailed by an outbreak of bank failures. Whole districts were left without banking facilities, and with deposits frozen. In March this movement culminated in a nation-wide "bank holiday" by Presidential order, which lasted for a number of days. Most of the banks re-opened shortly, but a few are still closed. Business fell in March to the lowest point of the depression.

During the latter part of March the tide began to turn. In April we went off the gold standard. The Business Index climbed upward at a rapid rate, and continued for four months with hardly a pause, to the highest point since 1930.

Then it turned down again and continued to drop almost without interruption until October. From then until the present time it has been almost static at about the level of December 1932. It is far from good, but it is clearly above the bottom.

The unusual feature of the year 1933 was that business was more sharply influenced by political developments than in any other year since the war. Congress passed measures giving almost dictatorial powers to the President over banking, currency, railroads, agriculture and industry.

The National Industrial Recovery Act has probably had the most direct effect on industry. Its results have been the subject of endless controversy. From the survey made by **Metal Industry** (see page 1 of this issue), it has without doubt increased employment and increased wages. To a certain extent it has stimulated buying and consequently manufacturing of consumer goods. The report as to profits under the National Recovery Administration vary widely from good to bad. Coincidentally with the N.R.A., however, has come a plague of strikes, most of them about the question of union recognition. At this time the number of strikes seems to be subsiding.

Almost all of the metal and finishing industries have gone or are going under codes, and a large number of new trade associations have been formed to manage their industries, to eliminate ruthless, unintelligent, cut-throat competition.

The consumer goods industries have done not so badly; in fact they did well between April and September. The greatest sufferers of the depression, however,—capital goods—are still in the slough. It is hoped that the Government construction program will give them a start.

At present business is marking time. The Government has embarked on a plan of buying gold in American and foreign markets at rising prices. The avowed purpose is to increase the prices of raw materials until they return to the levels of 1926,—presumably by reducing the value of our currency.

Prices have risen, but not so fast as our currency has depreciated abroad. This policy, together with the permissive acts listed above, have had the effect, however, of seeming to foreshadow direct currency inflation. It is known also that there is a strong group in Congress in favor of just such action. As a result, business is waiting to see what will be done. Will Congress authorize "wall paper money"? Would the President sign such an act?

METAL PRICES

THE trend of metals in general during the year 1933 was upward. In a few cases the gains were sharp, but in most the uptrend was slow although fairly steady. Copper rose from a low of about 5 cents to a high of 9, and has since settled back to about 8 cents per pound. Zinc moved from a low of less than 3 cents to a high of almost 5, and is now back to about 4½. Tin skyrocketed from 22 cents to a present figure of 51.85. Lead went from 2.87½ to about 4½ cents, and is now back to a little over 4. Aluminum and nickel remained unchanged throughout the year. Antimony rose slowly from about 5.70 cents to a high of something over 7. Silver was another fancy performer, mounting from about 25 cents an ounce to its present high of 44⅝. It will go higher since the Government will now buy all newly mined American silver at a net of 64½c per ounce. Platinum also climbed at a good rate, moving from about $22 per ounce to a high of $38.

There is one newcomer in this list, however,—gold. For the first time in many decades we have had a fluctuating market in gold. Under the Administration's policy of bidding up this metal in the open market, naturally its only course has been upward from the time these operations began with gold at its old figure of $20.67 per ounce. It has risen steadily to a present high of $34.06.

Difficult as it is to predict futures in metal prices, we venture a guess that the trend is more likely to be upward than downward in copper, zinc, lead and antimony, as these metals have moved only a small amount. Tin is unpredictable because it is subject to influences outside of our control which may be changed overnight. Silver should rise gradually toward the Government price. With gold rising in price, platinum may gain additional popularity, and the demand may force it upward also.

TECHNICAL DEVELOPMENTS

NATURALLY enough, in the fourth year of a depression there was no flood of improvements in either products or equipment. Nevertheless, 1933 was not entirely barren. A new lead alloy appeared, containing 0.06 to 0.10 per cent tellurium, with the balance lead. This material is reported to have very unusual chemical and physical properties. There has been progress in the continuous casting of brass 12 to 18 inches in width and 3/16" thick, the material being rolled as it is cast or flowed into the rolls. Work is also being done on the manufacture of seamless copper and brass tubing by "squeezing" instead of drawing.

Nickel seems to have found some more places to be of service. It is being used for the storage of caustic soda. A new bronze of the copper-tin type, containing 8 per cent nickel, has been found to be heat-treatable and to develop an elastic limit as high as 55,000 pounds per square inch. Also, a new bearing metal is being tried, containing 2 per cent nickel and the balance cadmium.

No developments of any great importance have been heard of in sand casting. There is increasing interest, however, in the gravity casting of brass in permanent molds. This process seems to be definitely on the rise.

In the electroplating field, an important event was

the publication of a Progress Report by the Bureau of Standards on the protective value of electroplated coatings on steel, the research project on 7,000 specifications undertaken with the backing of the American Electroplaters' Society.

Considerable interest has developed in a new type of bright nickel solution which deposits very rapidly with a very high gloss.

ECONOMIC DEVELOPMENTS

THE past year has been an exciting time. A number of extraordinary, unforeseen and almost unforseeable events took place.

The United States went off the gold standard in April. Gold continued to be purchased by the Government at the same price, however, $20.67 per ounce until early in September, when a rising market was established and gold rose. It is now over $34 per ounce. It is not impossible that platinum may become more popular for jewelry purposes than formerly because it is now selling at only a little more than gold.

Silver assumed monetary importance in December with the Presidential order to purchase over 24,000,000 ounces per year of newly mined American metal at a net of 64½ cents an ounce. The open market for silver is also rising, of course, but so far has gone to only 44⅝ because this order applies only to newly-mined metal.

Markets for non-ferrous metals, naturally enough, have not developed to any great extent during the last year. On the other hand some metals have gone ahead. Aluminum continues to find new applications in such places as railroad cars, automobile cylinder heads, and equipment for breweries and distilleries; also for plate and structural shapes for bridge floors. The brewing and distilling industries stand out as renewed and important consumers of metals such as tin pipe, copper in various forms, nickel and nickel alloy equipment, and aluminum and aluminum alloys.

Copper consumption at this time is reported to be at the rate of about 200,000 tons per year more than mined production. This would promise well for the price of copper in the future if the volume secondary metal could be controlled in something like the same proportion as the primary.

The secondary metal industry was dull except for gold bearing sweeps which were buoyed by the financial program of the government.

The American Tin Trade Association has set up a Tin Research and Development Committee to expand the present uses of tin and develop new uses.

Chromium plating again came into the limelight through the suit of United Chromium, Inc., against the Bassick Company of Bridgeport, Conn., and the General Motors Corporation of Detroit, Mich. The case was tried in October. A decision will be rendered some time after March 15, 1934, when all briefs and oral arguments will have been heard.

Probably the most important economic development in the metal industries during the year has been the formulation of codes for its various branches and divisions. To date, codes have been approved for Copper and Brass Mill Products, Fabricated Metal Products, Anti-Friction Bearings, Non-Ferrous Foundries and Brass Ingots. The Fabricated Metals Code also includes Metal Coating and Finishing.

THE OUTLOOK FOR 1934

WHAT is the outlook for the metal industries in 1934? These are difficult times for predictions. The railroads need new equipment and will probably get financial help to buy it. The automobile industry seems to be improving. In the electrical industries consumer goods are doing better; industrial equipment is still very low. Their main hope lies in the Government construction program. Building and engineering construction were better in 1933 than in 1932, but they are still very low and the outlook for large increases is dubious although strenuous efforts are being made along these lines. Metal manufacturing and metal coating depend to a great extent on the above industries.

By and large 1933 was a better year than 1932. Improvement brought with it new problems, however. Along with increased business and some improvement in prices and profits came labor disturbances. There is no certainty that they will not reappear in the Spring. Unemployment has been reduced, it is stated by about 20 to 25 per cent, but there are still about 10,000,000 unemployed. Public buying has increased and the consumer industries are doing better but the capital goods industry is lagging far behind.

The worst element in our present situation, however, is nothing concrete. It is Fear. Fear of the Government in business; fear of selfish domination by class interests; and last and most important, fear of uncontrolled currency inflation. Possibly all of these fears are groundless, but they retard progress.

A statement in the daily press by L. F. Loree, president of the Delaware & Hudson railroad represents this point of view.

> "Present factors make reasonable the assumption that the new year will be a transitional period from the concluding phases of the depression and we may hope that by 1935 we shall be well out of the slough.
>
> "The Federal government now has a public debt of about $23,500,000,000, some $11,000,000,000 of which is borrowed from the Federal Reserve and commercial banks. The effect of this enormous frozen asset upon our credit resources must be very great. If to this we add the destruction of capital growth due to Federal and state graduated income and inheritance taxes, one wonders whether, when times are again good and business, with the growing population, reaches a healthy expansion, we shall not be halted by the lack of capital resources."

That not everyone shares these fears is also true. There is comfort in the statement by W. C. Teagle, president of the Standard Oil Co. of New Jersey.

> ". . . . . Business men must take the initiative in regulating their own affairs to the end that interference by Government may be restrained to a minimum . . . . . I am convinced that Washington does not want to run private business . . . . . A proper concern for the rights of workers and the maintenance of some form of contact through which they could bring their problems to management, would have been in most cases, the means of keeping disputes from reaching formidable proportions."

Also the opinion of Gerard Swope, president of the General Electric Company.

> "The problem of to-day is to have a greater revival in the capital goods industry which has felt the increase but little, and with all the experiments that are being made and the hopeful and constructive attitude being shown, we are looking forward with confidence that 1934 will be a better year than 1933 in employment and in industry."

So we may take heart. It seems to be the general opinion that the depression has run its course like a disease, and that we are convalescing. May the recovery be steady and sure!

Correspondence and Discussion

The Dilemma of the Plating Industry

Editor's Note—The following is an excerpt from a letter which was too long for our limited space, but which we felt should be published in any case as its bearing on the electroplating trade is of immediate interest:

To the Editor of METAL INDUSTRY:

Referring to your editorials in the early part of 1933, warning the plating foreman of certain dangers:

Who is responsible for present conditions, admitting that the industry is below par? Many foremen are not up-to-date. But a manufacturer cannot expect to get an electrochemist for $35 a week, as it costs as much to train a plating foreman who is also an electrochemist as it does to educate a doctor or lawyer.

The plating foreman has lots to contend with, such as outrageous ideas on economy from his superiors. I have heard of foremen being told they used too much steam; that a hot cleaner would melt the solder off the work; to eliminate a number of very important steps in cleaning greasy work before plating it; to place greasy work directly in a plating bath without cleaning. Some want work plated heavily enough to take severe polishing because they do not want to polish the work properly before plating.

But the worst enemies of the plating trade are the "field mice" who gnaw at the industry by recommending incompetent men who do not even know the first elements of electrodeposition. Some of these are hobnobbing with the Electroplaters' Society. But a lot of manufacturers are on to them, and it won't be long before they lose out.

As for lower costs and chemical control, there are many points in electrodeposition that the chemist does not know.

Does trouble start with inferior deposits? Are we getting the same kind of castings we got 40 years ago? And polishing is a lost art today. Years ago work came into the plating room all polished. Not today. Coarse emery marks, no uniform surface is what the plater gets. It is dragged out, but not polished with the present day wheels. Does this lower costs? At what penalty? The motto seems to be, "Let the deposit cover it all up." Put on a deposit of 3/1000", then the polisher will buff it down to 1/1000" or less with a 14-inch sewed wheel. Then what protection has the work? What is the use of putting it on when you take it off again?

Every foreman should be able to keep chemical control of his solutions. It is not a secret or difficult to do, with present day equipment. But you must also be a wizard. Manufacturers demand that you know positively everything in the line of plating or finishing, including polishing. There is where a knowledge of metallurgy comes in. You must understand lacquer, paint, enamel and tumbling. You must really have more knowledge than any chemist, or you are "out". I know a foreman plater who supervises graining, and has to match it with other manufactured goods; not only transfer, but hand graining also. Bring yourself up to this standard and you wont have to fear any chemist will take your job. I wouldn't give a nickel for all the chemical knowledge without the practical end of it.

Some platers show around a good deposit with some pride. Good. They should be encouraged. But I have never seen a deposit that was satisfactory to me. We can always improve it. Don't go around showing one good article, and have another plater visit your plant and find all your solutions out of kilter, and the anodes on the floor. Once a foreman showed around a wonderful brass deposit he was producing with a large conveyor that was putting 7/1000" of deposit on the work in 11 minutes. I went to see it done, and brought along some of my own plant's test pieces. (I run a test for deposit quality weekly.) Well, he was either not honest or not confident, for he walked me around the machinery, and he instructed the man at the conveyor to make it a double run. I took my sample back to the chemist at my plant and we found it tested less than 1/1000" of deposit. Such misrepresentation gets the industry "in Dutch".

What has become of the old-time deposits like triple-silver, brass for trunk hardware, iron piano pedals plated to take a polish with a 120 emery grease wheel and still have enough brass plate left to take a buffing from a 14-inch sewed wheel? It can be done; but wouldn't the pedals be better plated if polished properly before plating, and more of the deposit was left on them?

The time is coming when manufacturers will be forced by authority to put a definite amount of deposit on their products. The job shop will also have to mend its ways and give public honest quality. There is no reason why the backward cannot improve themselves. There is plenty of good literature; the METAL INDUSTRY, for instance, has lots of good meat. Platers should read every copy several times. Read some of the shop problems and compare yourself with the one asking the question.

A foreman plater's day does not end with the whistle. Many nights I have spent in research. There is a kick in it, too. It comes from solving your own problems.

Paul C. Kramarcik.

Syracuse, New York.

Technical Papers

Composition of Grids for Positive Plates of Storage Batteries as a Factor Influencing the Sulphation of Negative Plates, by G. W. Vinal, D. N. Craig, and C. L. Snyder, Bureau of Standards, Department of Commerce, Washington, D. C.

Abstract:—The conditions under which antimony, a constituent of battery grids, may produce detrimental effects in the operation of storage batteries have generally been regarded as exceptional. Recent experiments at the Bureau and elsewhere have shown, however, that the corrosion of the grids of positive plates, under normal operating conditions, may liberate antimony from the alloy in sufficient amounts to affect the operation and life of the negative plates. Two series of cells were prepared and operated in the laboratory to study the effect of varying decomposition of the grids for positive plates. The first series included all cells having lead-antimony grids and the second included cells having positive grids containing various percentages of cadmium. Data on the capacity of these cells during 115 cycles are given, together with measurements of plate potentials, rate of sulphation, and the chemical analysis of the active material of negative plates for antimony.

Research in the Elimination of Noise in Industrial Gas Burners. American Gas Association Testing Laboratory, 1032 East 62nd Street, Cleveland, Ohio. Second Bulletin, Committee on Industrial Gas Research. Project No. 13, Report No. 724.

Government Publications

Thermal Expansion of Refractories to 1800° C. By R. A. Heindl. Research Paper RP562, part of Bureau of Standards Journal of Research, Vol. 10, June, 1933. Bureau of Standards, Department of Commerce, Washington, D. C.

Shop Problems

This Department Will Answer Questions Relating to Shop Practice.

ASSOCIATE EDITORS

Metallurgical, Foundry, Rolling Mill, Mechanical

H. M. ST. JOHN — W. J. PETTIS
W. J. REARDON — W. B. FRANCIS

Electroplating, Polishing, and Metal Finishing

O. J. SIZELOVE — A. K. GRAHAM, Ph.D.
G. B. HOGABOOM — WALTER FRAINE

Antique Green Gold

Q.—How can I reproduce the finish on the enclosed emplematic pin?

A.—The sample pin has been finished in an antique green gold solution, and the following formula can be used:

Metallic gold as fulminate or cyanide	6 pennyweight
Silver cyanide	1/3 pennyweight
Sodium cyanide	5 oz.
Potassium carbonate	6 oz.
Water	1 gallon

The solution should be operated at 105°F., using 4 to 6 volts. A small quantity of lead carbonate dissolved in caustic soda is added to the solution very cautiously to produce the antique or smut effect.

The front of the pin or the highlights are relieved by using bicarbonate of soda moistened with water and a small muslin wheel operated at 800 R.P.M. The back and edges of the pin are scratchbrushed wet, using a fine crimped brass wire wheel. After the work is inspected, lacquer to protect finish from tarnishing. O.J.S., Problem 5,257.

Bulk Lacquering

Q.—We enclose samples of our snap fasteners. Our problem is to get a lacquer protection over these when silver plated, and yet have a cheap method of applying lacquer coat.

A.—We would suggest the use of a small oblique iron tumbling barrel for lacquering small work in bulk. Procure some fine mesh wire screen and form it to the shape of the barrel. It should be made an inch or so smaller than the inside of the barrel and held in place by supports fastened to the sides of the barrel.

The barrel should not revolve too fast—just fast enough to separate the work, and the lacquer is applied by spraying. O.J.S., Problem 5,258.

Casting Bronze Bushings

Q.—I am sending you a piece of bronze bushing which has been broached. If you look closely you will see that the broach has dragged or torn it. We do a lot of bushing work which is all broached in our plant. The small ones do not give us much trouble, but as we get into the larger ones they all seem to tear. The fracture of this bushing seems to show

USE THIS BLANK FOR SOLUTION ANALYSIS INFORMATION

Fill in all items if possible.

Date.....

Name and address: .....**Employed by:** .....

Kind of solution: .....**Volume used:** .....

Tank length: .....**width:** .....**Solution depth:** .....

Anode surface, sq. ft.:.....**Cathode surface, sq. ft:** .....

Distance between anode and cathode: .....**Kind of anodes:** .....

Class of work being plated: .....**Original formula of solution:**.....

REMARKS: Describe trouble completely. Give cleaning methods employed. Send small sample of work showing defect if possible.

Use separate sheet if necessary. _____

NOTE: Before taking sample of solution, bring it to proper operating level with water; stir thoroughly; take sample in 2 or 3 oz. clean bottle; label bottle with name of solution and name of sender. PACK IT PROPERLY and mail to METAL INDUSTRY. 116 John Street, New York City.

that the metal has been slightly gassed, and this, I think, is the reason for the broach tearing.

We melt with an electric furnace and the metal is poured into a heated pot on charcoal; 2 to 4 ounces of phosphorous to the 100 lbs. is placed on the bottom of the pot. I sometimes replace the phosphorous with 1% or 2% of zinc. Then the casting shows a close grain and they broach out smooth. I cannot, however, use the zinc method at all times because of the analysis required.

When I start the furnaces in the morning I give them about 30 KW. This brings the furnaces to red heat. I then throw in the charge (450 lbs.) of metal (80-10-10). It melts down and is ready to pour in about 50 minutes. The second heat is ready in about 30 to 40 minutes.

I have tried throwing the phosphorous in with the charge, and have also tried throwing half with the charge, the balance after the metal is melted. I have also raised and lowered the amount of phosphorous, and have used barium sulphate, 1% to 3% to 100 lbs. in the furnace, but the results are the same.

These castings are made on a squeezer machine in No. 1½ Albany sand. The cores are made of Michigan City core sand; the molds are well vented, and the gas comes away free. The molds are poured flat at about 1900° F., the metal entering the mold through a single gate at one end.

Is it possible that the broach is not properly designed, hence causing this defect?

A.—We received the sample piece of bronze bushing. Upon examination of same we feel your trouble may be due to one of the following causes:

1. Metal poured too cold; we suggest pouring at 2000°F.
2. Core not smooth enough. Core should not have any bumps or lumps; it should be smooth.
3. Not enough cutters in the broach. This is possibly the main trouble. We suggest looking into this phase.
4. Not enough clearance between cutter to clear chips.

From the description of your foundry practice we cannot see anything wrong there. However, the fracture of the metal shows some segregation. To improve the fracture we suggest that you add 2% of a mixture of 50 copper and 50 nickel. This can be purchased from the smelters. It will improve the fracture and help correct segregation.

W.J.R., Problem 5,259.

Demagnetizing Before Plating

Q.—We refer to the article, Rotary Grinding Before Plating, by Francis A. Westbrook, in your December, 1933 issue.

Why must an article be demagnetized before plating? Even with small quantities of magnetism, can it not be plated?

A.—If the work is not demagnetized before plating, small metallics that are in the plating solution will adhere to the surface of the work and cause a rough deposit.

O.J.S., Problem 5,260.

Silver Plating Celluloid

Q.—How can I silver plate celluloid bracelets? I would like to have the full procedure, including formulas for necessary solution.

A.—The celluloid should be sprayed with plater's copper bronze powder mixed with 1 part of lacquer and 7 parts of thinner. After the work is thoroughly dry, plate in acid copper solution until desired thickness of deposit is obtained, and then silver plate.

Formula for acid copper:

Copper sulfate	28 oz.
Sulfuric acid	3 to 5 oz.
Water	1 gallon

Formula for silver solution:

Silver cyanide	3½ oz.
Sodium cyanide	6 oz.
Sodium carbonate	2 oz.
Water	1 gallon

O.J.S., Problem 5,261.

Durable Bronze Finish

Q.—We are sending sample of a steel shell with a bronze finish, and would like you to tell us how to get this finish. We can get the color correctly, but it will not stand the test that our customer gives it. They test by rubbing it on a carpet. Our finish rubs off very quickly, and theirs stands up much longer. We have tried copper plate twenty-five minutes and then ran them through liver of sulphur solution, one ounce to a gallon of water. We also tried black nickel over the copper. We relieved both the above in rolling barrel with sawdust and pumice stone, but neither of them gave us a finish that was durable enough.

A.—We feel sure that the durability of the finish depends entirely upon the quality of the lacquer that is used as final coating.

With this class of work a "burn off" lacquer can be used. The work is placed in baskets, dipped into the lacquer and ignited over a flame. While the solvents of the lacquer are being consumed by the flame, the work is kept in motion, and after the solvents of the lacquer are driven off, a very durable finish is obtained. For this type of lacquer, consult your lacquer supplier.

O.J.S., Problem 5,262.

Gold Solution

Q.—Kindly send us formula for yellow gold solution that does not include gold chloride.

A.—Either gold cyanide or fulminate of gold can be used in preparing a gold solution. The gold cyanide can be purchased ready for use, and we would suggest that you use this if you are not familiar with making the fulminate of gold. Formula for gold solution:

Gold cyanide	½ oz.
Sodium cyanide	1 oz.
Phosphate soda	1 oz.
Water	1 gal.

Use the solution at a temperature of 140° to 160°F., with 1½ to 2 volts.

O.J.S., Problem 5,263.

Silver Analysis

Q.—Please analyze silver solution I am sending you.—J. C., New York.

A.—Analysis of silver solution:

Metallic silver	2.85 oz.
Free cyanide	10.07 oz.
Carbonates	8.97 oz.

Both the free cyanide and the carbonate content are too high. The carbonates should be removed by the freezing out process. After the carbonates have been removed, add 2 oz. silver chloride to each gallon of solution.

O.J.S., Problem 5,264.

Nickel Analysis

Q.—Please analyze the nickel solution we are sending you under separate cover.—Olean, N. Y.

A.—Analysis of nickel solution:

Metallic nickel	2.21 oz.
Chlorides	2.28 oz.
pH	5.2

The pH of the solution is too low, and should be adjusted by adding 5 cubic centimeters of 26° ammonia to each gallon of solution.

O.J.S., Problem 5,265.

Patents

A Review of Current Patents of Interest

Printed copies of patents can be obtained for 10 cents each from the Commissioner of Patents, Washington, D. C.

1,921,417. August 8, 1933. **Alloy.** Robert H. Leach, Fairfield, Conn., assignor to Handy & Harman, New York, N. Y.

1,921,418. August 8, 1933. **Alloy.** Robert H. Leach, Fairfield, Conn., assignor to Handy & Harman, New York.

1,921,681. August 8, 1933. **Die-Casting Method.** Torbjorn C. Korsmo, Madison, Wis., assignor to Madison-Kipp Corporation, Madison, Wis.

1,921,820. August 8, 1933. **Reducing Zinciferous Material.** Edwin C. Handwerk and George T. Mahler, Palmerton, Pa., assignors to The New Jersey Zinc Company, a Corporation of New Jersey.

1,921,760. August 8, 1933. **Alloy.** Robert H. Leach, Fairfield, Conn., assignor to Handy & Harman, New York, N. Y.

1,921,825. August 8, 1933. **Process for the Recovery of Metal Values.** Frederich Johannsen, Magdeburg, Germany, assignor to the firm Fried, Krupp Grusonwerk Aktiengesellchaft, Magdeburg-Buckau, Germany.

1,921,868. August 8, 1933. **Method of Melting Nonferrous Metals.** George Septimus Evans, Bronxville, N. Y., assignor to The Mathieson Alkali Works, New York, N. Y.

1,921,941. August 8, 1933. **Electrodeposition of Paladium.** Alan Richard Powell and Emyr Conwy Davies, London, England, assignors to Johnson Matthey & Company Limited, London, England.

1,922,005. August 8, 1933. **Method of Plating.** William R. Stocking, Glastonbury, Conn., assignor to The Williams Brothers Manufacturing Company, Glastonbury, Conn.

1,921,998. August 8, 1933. **Method of Improving Aluminum and Alloys Thereof.** Walter Bonsack, Cleveland, Ohio, assignor to The National Smelting Company, Cleveland, Ohio.

1,922,028. August 15, 1933. **Dynamo-Electric Machine.** Pierre I. Chandeysson, St. Louis, Mo.

1,922,037. August 15, 1933. **Treatment of Metals.** Charles Hardy, Pelham Manor, N. Y., assignor to Hardy Metallurgical Company, a Corporation of Delaware.

1,922,108. August 15, 1933. **Buffing Wheel.** Joseph W. Myers and Ernest E. Murray, Jackson, Mich.

1,922,387. August 15, 1933. **Silver Plating Compound and Method of Silver Plating.** John H. Muller, Secane, Pa., assignor to International Resistance Company, Philadelphia, Pa.

1,922,390. August 15, 1933. **Process of Recovering Zinc From Brass Scrap and Other Materials Containing Zinc.** William J. O'Brien, Cleveland, Ohio, and Joseph E. Drapeau, Jr., New York, N. Y., assignors to The Glidden Company, Cleveland, Ohio.

1,922,428. August 15, 1933. **Apparatus for Smelting Aluminum.** John G. G. Frost, Cleveland, Ohio, assignor to The National Smelting Company, Cleveland, Ohio.

1,922,429. August 15, 1933. **Process of Melting Aluminum.** John G. G. Frost, Cleveland, Ohio, assignor to The National Smelting Company, Cleveland, Ohio.

1,922,598. August 15, 1933. **Die-Casting.** Louis H. Morin, New York, N. Y., assignor to Doehler Die-Casting Co., a Corporation of New York.

1,922,853. August 15, 1933. **Process for the Electrolytic Deposition of Chromium.** Hermann Kissel, Leipzig, Germany, assignor, by mesne assignments, to United Chromium, Inc., New York, N. Y.

1,923,000. August 15, 1933. **Production of Metal Castings.** Richard William Bailey Hale, England, assignor to Associated Electrical Industries Limited, a Company of Great Britain.

1,923,058. August 15, 1933. **Method of Treating Metals.** Harry Raymond Lowstutter, Monessen, Pa.

1,923,214. August 22, 1933. **Die-Casting Apparatus.** Torbjorn C. Korsmo, Madison, Wis., assignor to Madison-Kipp Corporation, Madison, Wis.

1,923,502. August 22, 1933. **Process and Product for Protecting Aluminum, Magnesium, Zinc and Their Alloys Against Corrosion.** Pierre Prier, Clichy, France.

1,923,539. August 22, 1933. **Production of Anticorrosive Protective Coatings on Light Metals.** Alexander Jenny, Berlin-Charlottenburg, Heinz Siebeneicher and Nicolai Budiloff, Berlin-Friedenau, Germany, assignors to Siemens-Electro-Asmose G. m. b. H., Siemensstadt near Berlin, Germany.

1,923,591-2. August 22, 1933. **Process for Improving the Mechanical Properties of Magnesium and Its Alloys.** Walther Schmidt, Hans Bothmann, and Josef Ruhrmann, Bitterfeld, Germany, assignors, by mesne assignments, to Magnesium Development Corporation, a Corporation of Delaware.

1,923,642. August 22, 1933. **Cleaner for Articles of Metal.** Otto Roth, Jr., Bad Ems, Germany.

1,923,702-3; 1,923,732. August 22, 1933. **Nongelling Lacquer.** Charles Bogin, Terre Haute, Ind., and Vaughn Kelly, Chicago, Ill., assignors to Commercial Solvents Corporation, Terre Haute, Ind.

1,923,760. August 22, 1933. **Grinding Machine.** John A. Smith, Cincinnati, Ohio, assignor to The United States Electrical Tool Company, Cincinnati, Ohio.

1,923,790. August 22, 1933. **Chromium Plated Article and Method of Making the Same.** George L. Moore, Cleveland, Ohio, assignor to Aluminum Company of America, Pittsburgh, Pa.

1,923,828. August 22, 1933. **Method of Deenameling.** Joseph Janota, Jr., Chicago Heights, Ill., assignor to Victor Chemical Works, a Corporation of Illinois.

18,930, re-issue. August 29, 1933. **Refining Lead.** Philip W. Davis, Cambridge, Mass.

1,924,097. August 29, 1933. **Alloy.** Julius Aderer, New York, N. Y.

1,924,151. August 29, 1933. **Method for the Manufacture of Beryllium and Beryllium Alloys.** Louis Burgess, New York, N. Y.

1,924,168. August 29, 1933. **Alloy of Aluminum and Beryllium.** Joseph Kent Smith, Detroit, Mich., assignor to Beryllium Development Corporation, New York.

1,924,200. August 29, 1933. **Furnace for Smelting Aluminum.** Julius Schuffler, Essen-Ruhr, Germany, assignor, by mesne assignments, to The Koppers Company of Delaware, Pittsburgh, Pa.

1,924,201. August 29, 1933. **Apparatus for Smelting Aluminum and Other Light Metals.** Julius Schuffler, Essen, Germany, assignor, by mesne assignments, to the Koppers Company of Delaware, Pittsburgh, Pa.

1,924,245. August 29, 1933. **Process for Improving Nickel-Tin-Alloys.** Werner Koster, Dortmund, Germany, assignor to Vereinigte Stahlwerke Aktiengesellschaft, Dusseldorf, Germany.

1,924,245. August 29, 1933. **Process for Improving Nickel-Molybdenum Alloys.** Werner Koster, Dortmund, Germany, assignor to the firm Vereinigte Stahlwerke Aktiengesellschaft, Dusseldorf, Germany.

1,924,410. August 29, 1933. **Method and Means for Forming Separable Plated Coatings on Metal Surfaces.** Charles E. Marker, Detroit, Mich., assignor to Chrysler Corporation, Detroit, Mich.

1,924,439. August 29, 1933. **Process of Forming Alloy Materials by Electroplating.** Harold J. Kersten, Cincinnati, Ohio.

1,924,581. August 29, 1933. **Alloy.** Richard A. Wilkins, Rome, N. Y., assignor to Revere Copper and Brass Incorporated, Rome, N. Y.

1,924,725-6-7. August 29, 1933. **Aluminum Alloys.** Howard J. Rowe, Lakewood, Ohio, assignor to Aluminum Company of America, Pittsburgh, Pa.

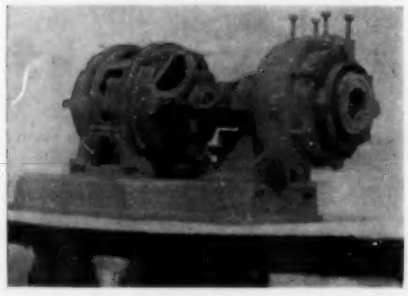
Equipment

New and Useful Devices, Metals, Machinery and Supplies

New Centrifugal Pump

A new series No. P-1021-N centrifugal acid pumps (chemical stoneware lined) has been placed on the market by the United States Stoneware Company, 50 Church Street, New York. The following outstanding features are claimed for this new design:

1. Compactness. There is a material reduction in floor space for a given pumping capacity.
2. Double packing gland which prevents all spraying. Semi-automatic gland adjustment. Temperature compensation to maintain constant gland pressure.
3. Dual impeller, providing gland relief. Adjustable impeller clearances. The chemical stoneware impeller functions perfectly at 1750 R. P. M.
4. Accessibility, permitting the removal of any wearing part in ten minutes.
5. Absolute standardization of all parts.
6. All stoneware parts are ground into the protecting armor, rather than being cemented in.
7. Corrosion-resisting alloys used in all metal parts.
8. Timken bearings may be taken up without altering impeller alignment.
9. An over-all efficiency equal to similar sized all-metal pumps for water service.



"U. S." Centrifugal Pump

These pumps are suitable for the pumping of all acids, alkalies and corrosive metals, the only exception being hydrofluoric acid. Special Pumps can be made for high head work and for pumping hot liquids.

Standard sizes are the 1¼", 2" and 3".

New Silicon Bronzes

The Bridgeport Brass Company, Bridgeport, Conn., has added to its line of silicon bronzes which carry the trade name Duronze. The original alloy was Duronze I. Recently they have developed Duronze II for the manufacture of range boilers and automatic heaters. This has been followed by Duronze III, an alloy said to be exceptionally hard and strong and to forge readily, producing parts which have a tensile strength of about 90,000 pounds per square inch. The booklet "Duronze" gives full particulars of all of these alloys.

Soaps for the Plating Room

The Hanson-Van Winkle-Munning Company, Matawan, N. J., puts out a varied line of soaps for the plating shop. This line includes Acme soap chips, a highly concentrated neutral soap chip containing 85-90 dry soap. These chips are for burnishing either brass or steel; are said to be a free rinsing and not to tarnish the work. Acme soap can also be supplied in powdered form.

Another product is the New England cleaner, a refined fish oil soap used to remove buffing greases and oils from brass, aluminum, nickel-silver, etc. Unlike most strongly alkaline cleaners, New England cleaner, it is stated, will not attack the aluminum or tarnish brass. It will remove heavy mineral oil from iron or steel parts even down to deep recesses.

The No. 6 soap is recommended as a general purpose cleaner for removing heavy oils and greases.

The Platers' Soap is a straight fish oil soap available to manufacturers who wish to compound a soap to their own specifications. For ordinary requirements a concentration or 4 to 6 ounces per gallon is recommended with a working temperature of 180° F.

Latest Products

Each month the new products or services announced by companies in the metal and finishing equipment, supply and allied lines will be given brief mention here. More extended notices may appear later on any or all of these. In the meantime, complete data can be obtained from the companies mentioned.

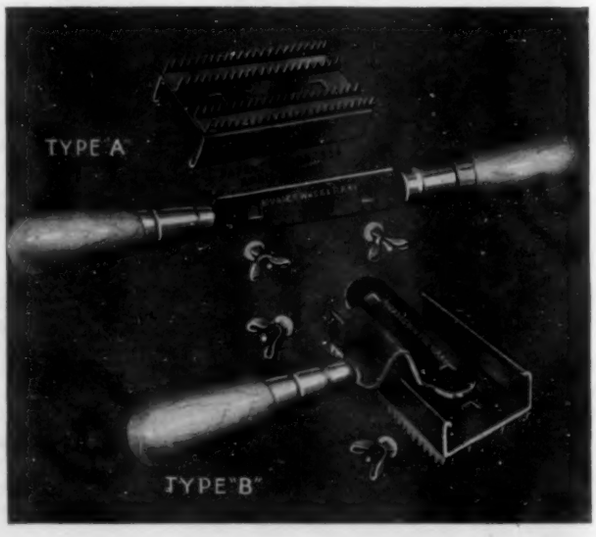
Automatic Lathe. The Magna-Matic, said to employ entirely new principles in construction, control and operation, and provide simpler and quicker means of changing jobs; adaptable to small-lot as well as long-run production. Monarch Machine Tool Company, Sidney, Ohio.

Pre-finished Sheet Metals. Tinplate coated with nickel, chromium, brass, copper, etc., in bright, satin or etched satin finishes, and in plain flat or crimped patterns ready for further fabrication into utensils and other products. Apollo Metal Works, La Salle, Ill.

Bench Furnace. The new "Red Devil" No. 30 gas furnace for temperatures up to 1800° F., for heating soldering irons, heat-treating, melting, etc. on a small inexpensive scale. Red Devil Manufacturing Company, Bellwood, Ill.

Buffing Wheel Rake

A buffing wheel rake is being sold by the Matchless Metal Polish Company, Glen Ridge, N. J., under the trade name Advance. This rake is said to rake the wheel evenly and only to a depth of about ¼ inch. It does not tear the buff at the face. The construction is such as to permit the operator to insert a new rake into the holder by means of thumb screws only, no wrench or other tool being required. The teeth are made of heavy metal, hardened to lengthen their life.



"Advance" Buff Wheel Rake Showing Two Handle Styles

Instrument Boards for Plating Plants

By I. P. CHANDEYSSON

President, Chandeysson Electric Company, St. Louis, Mo.

Simplicity, always desirable is especially so in the electrical equipment of the plating room. The motor generator set should be turned on and off as easily as an electric light and when operating automatically protected. If the plater in charge has a reliable voltmeter (V) indicating the correct voltage, a reliable ammeter (A_1) indicating the correct number of amperes flowing and means (R_1) of adjusting the voltage of his generator nothing more is necessary or desirable. (Letters refer to illustration.)

Automatic push button starters (S) with overload and low voltage protection are manufactured in standard sizes by General Electric, Cutler Hammer, Westinghouse and others. These starters, after years of development are rugged and dependable. You push a button (B_1) and the motor generator set starts whether it be right in front of you, behind your back or in another room.

Pushing another button (B_2) will bring the motor generator set to rest.

In case of a short circuit or of prolonged overload that might injure the motor generator set an overload relay stops the apparatus.

The same thing happens should the line voltage fail or for some reason become dangerously low. Pulling the reset button (B_3) and pushing the starting button again is quicker done than said but unless the cause has been removed the automatic will trip again protecting the apparatus.

In practice it is rarely that these protective features are brought into operation: they are adjusted in the factory to take care of reasonable overload and being emergency devices analogous to fuses their presence is generally forgotten.

Automatic starters operate equally well on synchronous as on squirrel cage motors provided the synchronous motor is equipped with a direct connected exciter, has the terminals of its rotating field permanently connected across the terminals of the exciter and the synchronous motor is designed so as to have a good starting torque and a good pulling in torque.

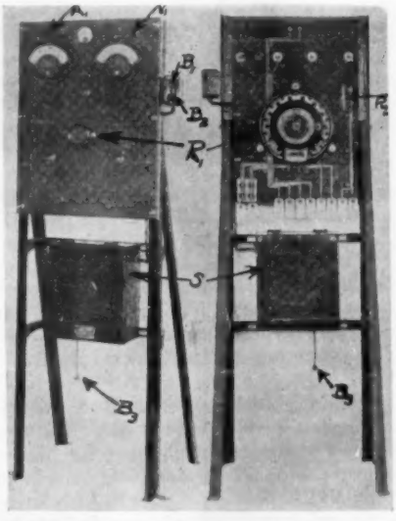
Pushing the starting button (B_1) brings the polyphase current in the stator windings whose reaction on the squirrel cage of the rotating field produces a torque accelerating it towards synchronous speed.

The exciter does not begin to generate until reaching a critical speed and when properly designed that critical speed is higher than the speed from which the exciting rotating field can pull into synchronism; therefore the synchronous motor pulls into synchronism automatically without the help of any switch, relay or other device manual or automatic.

It is well known that a dangerous potential is generated in the windings of the rotating field and available at its terminals when these are open.

When the terminals are connected permanently across the terminals of the exciter that connection amounting almost to a short circuit precludes a rise of voltage dangerous to the insulation and to the attendant should he accidentally complete the circuit.

Therefore the automatic push button starter (S) with its protective features is all that is necessary to start, stop and protect a set whose motor is either squirrel cage or synchronous provided that in the later case the design of the synchronous motor and its direct connected exciter has been laid out with that purpose in view.



Combination Generator, Motor and Exciter Panel

The set being started there should be nothing else to do but adjust the voltage of the plating generator.

Neither the superintendent of the plating department nor his assistant in a large plant, nor the plater in the most modest place should be called upon to adjust the power factor of synchronous motors, the voltage of the exciters. What they are interested to control is the voltage (V) of the generator.

The power factor of the synchronous motor should be adjusted once for all when the set is tested in the manufacturer's plant and the voltage of the exciter set permanently by a fixed resistance (R_1) at the same time.

It is true that the exciter voltage will be slightly higher when just started, and that the power factor of the synchronous motor will for that reason (and also because its rotating field is cold) be slightly more leading than the predetermined value. It is seldom if ever that these features are objectionable.

With a combination panel of the type described a button (B_1) is pushed and the set is started. Then the only thing left to do is to adjust the voltage by turning the handle of the generator field rheostat (R_1). To stop, press the stop button (B_2). Only three operations are necessary:

(1) Start—push button B_1; (2) adjust generator voltage—turn handle of rheostat R_1; (3) stop—push button B_2.

New Cleaning Process

A new cleaning process for metal parts has been developed by Oakite Products, Inc., 22 Thames Street, New York City. This process, called the Oakite Saturol Process is intended especially for removing dirt. It is based on the fact that oily dirt will adhere to an oily metal surface; dirt wet with water will adhere to a metal surface wet with water; dry dirt will adhere to a dry surface. Dirt wet with water will not adhere to an oily metal surface.

The process consists of wetting the oily dirt with water without wetting the oily surface with water. A special blended solvent is used which will mix with oil or water. This solvent saturates the oily dirt by penetrating it and mixing with the oil, but is not able to penetrate the oil film on the metal surface sufficiently to remove it. The dirt deposits on cold rolled steel can be penetrated in 15 seconds or less while other types of heavier dirt deposits require longer time up to as much as 15 minutes. The parts are then rinsed with cold water and the dirt is washed off the metal surface along with the solvent which adheres. This rinsing is done either by agitating the parts in a tank of cold water or by spraying cold water onto the parts. The latter is most rapid and provides the agitation automatically.

The parts still retain a very thin film of oil just sufficient to make the parts shed water. This thin film of oil is so light that it is quickly removed by the usual hot alkaline cleaning solution. Because the oil film left is uniformly distributed there is no necessity for prolonged soaking in the alkaline cleaner as is necessary to remove oil which is mixed with dirt. The process is therefore carried out in three steps briefly summarized as follows:

1. Saturating the dirt with the solvent.

2. Washing off adhering solvent and dirt.

3. Removing light oil film remaining on the surface.

The following advantages are claimed:

1. Elimination of hand wiping or tumbling operations previously required to remove dirt, finger prints, etc.
2. Elimination of irregularities in the electroplate or other finish where wiping or tumbling has been impractical.
3. Brighter finish of electroplated deposits.
4. Better coverage especially in plating recessed areas.
5. Improved adhesion of electroplate.
6. Increased speed of cleaning.
7. Improved corrosion resistance of electroplated surfaces.

Polishing and Buffing Compounds

Harrison and Company, Haverhill, Mass., have added several cutting down and polishing compounds to their line. They have a green for mirror work or other places where a high polish is needed on all kinds of steel, including stainless. Their new cutting compounds are recommended for use before putting on the mirror finish.

Different plants use different methods. Some prefer a soft compound while others a dry compound. It is the policy of Harrison and Company to provide a composition best suited for a specific job.

Another compound which they recommend is No. 1037 Pink for polishing chromium plated work.

New Whale Oil Soap

For a great many years whale oil soap has been the standard of the brass and soft metal trades for removing buffing compositions, for retarding, "spotting out" and for use as an anti-corrosion coating on brass and copper sheets and tubing.

Whale oil soap was originally made from whale oil but for a good many years most of it has been made from various mixtures of fish oils and fish oil foots. As a result the commercial "whale oil soap" never runs uniform. Each lot varies and so results vary.

Recently the Quaker Chemical Products Corporation of Conshohocken, Pa. has made a close connection with a firm that extracts vitamins of codliver oil. These vitamins are used in the original product. The residual devitaminized cod liver oil always runs uniform. The Quaker Chemical Products Corporation saponifies this cod liver oil and so is able to furnish a standard, uniform "Whale Oil Soap". The product is sold on the basis of 30% moisture content which means that it is sold on the basis of the actual soap contained in the product.

This new product is called "Quaker Whale Oil Soap S". It has a very fine texture, is relatively light in color and has less odor than the ordinary whale oil soap. It is claimed that not only does it run uniform thus eliminating production troubles due to variation of the soap, but that 1 lb. of it does the work of about 1½ to 2 lbs. of the ordinary whale oil soap furnished the trade.

Equipment and Supply Catalogs

Filtration Equipment. Shriver and Company, Harrison, N. J. Illustrated booklet, "Improved Filtration Cuts Plating Costs," giving useful data on filter presses for plating solutions. (37)

Polishing Abrasives. Norton Co., Worcester, Mass. Booklet, The Technical Aspect of Polishing Grain; excellently illustrated information on aluminum oxide abrasives. (38)

Pumps. Roots-Connersville-Wilbraham, Connersville, Ind. Bulletin 260-B11, generative turbine pumps for handling water, oils, acids and other liquids in comparatively small quantities at high pressures. (39)

Centrifugal Pumps. Worthington Pump & Machinery Corp., Harrison, N. J. Bulletin W-322-S1, monobloc, two stage pumps, for chemical process and other work. (40)

Protective Rubber Lining and Coating for Industry. Manhattan Rubber Mfg. Division, Raybestos-Manhattan, Inc., Passaic, N. J. Good illustrated booklet on tanks and other equipment. (41)

Plating. The Aurilyte Process Co., 246 N.J.R.R. Ave., Newark, N. J. A booklet telling about the various types of precious metal plating solutions this company sells, and its other services; also contains useful general information. (42)

Etching Machine. The U. S. Stoneware Company, Akron, Ohio. Bulletin 601 on Rotospray equipment for photo-engravers making zinc line cuts and zinc and copper halftones. Also mentions exhaust fans and chemical stoneware pipe. (43)

Silicosis. In view of the increasing prominence given to the effects of silica dust on the health of workers, the Industrial Health Section of the Metropolitan Life Insurance Company, One Madison Ave., New York, prepared a booklet for the information of plant superintendents and foremen in departments where silica dust is present. The booklet might be of aid in controlling dusty processes arising in the course of manufacture. Copies are available on request. Among processes in which silica dust is encountered, the booklet mentions metal casting, polishing, buffing, grinding, sandblasting, sawing, burnishing, etc. (44)

Polishing Supplies. The Lea Manufacturing Company, 16 Cherry Avenue, Waterbury, Conn., has issued its notebook for January, and also a handy celluloid gadget which quickly calculates either the surface speed of a buff wheel when R.P.M. are known, or the R.P.M. where surface speed is known. (45)

Plating Brighteners. E. Wambaugh Company, Goshen, Ind. Circular on preparations for various solutions. (46)

Rubber Linings. American Hard Rubber Company, 11 Mercer Street, New York. Circular on "Ace" hard rubber linings for plating tanks and equipment. Illustrated. (47)

Babbitt Metal. United American Metals Corporation, 200 Diamond Street, Brooklyn, N. Y. Booklet giving full data, illustrated, on "Syracuse Government Genuine" brand. (48)

Pyrometers. Thwing Instrument Company, 3339 Lancaster Avenue, Philadelphia, Pa. Bull. 11, Radiation Pyrometers; illustrated; full data. (49)

Metal Melting Furnaces. The Campbell-Hausfeld Company, Harrison, Ohio. Cat. 28, illustrated the full line of Hausfeld equipment. (50)

High Temperature Mortars. General Refractories Company, 106 South 16th Street, Philadelphia, Pa. Booklet 5504, illustrated. (51)

Ingot Metals. Ajax Metal Company, Philadelphia, Pa. "Seven Point" ingots fully described; includes copper base ingots, flux alloys, virgin metal pigs, etc. Tables of A.S.T.M. specifications and other data are included. (52)

Phosphor Bronze and Nickel Silver. The Riverside Metal Company, Box 130, Riverside, Burlington County, N. J. An illustrated bulletin on free-cutting alloys for milling, threading, machining, etc., in all rolled and drawn forms and blanks. Includes micrographs and other interesting data. (53)

Save time. Use the coupon below to get any of the above catalogs or bulletins, or for data on any subject not mentioned this month. METAL INDUSTRY will see that you get them promptly.

METAL INDUSTRY
116 John Street, New York.

(Insert below the number printed at the end of each item desired.)

I wish to receive the following bulletins mentioned in DECEMBER: .....

.....

I want information on the following equipment or materials also: .....

.....

Brass Goods. Royal Brass Manufacturing Company, Cleveland, Ohio. Leaflet on liquor faucets. (54)

Inflation Delays Recovery. Farrel-Birmingham Company, Ansonia, Conn. No. 5 in a series of booklets by Allen W. Rucker in collaboration with N. W. Pickering, president of the company mentioned. Describes five phases of inflation through which the United States has already passed, and discusses various economic trends. (55)

Potentiometer Pyrometers. Brown Instrument Company, Philadelphia, Pa. Catalog 1101, illustrated. (56)

Compressors. Worthington Pump and Machinery Corporation, Harrison, N J. Bul. L-612-B1A, illustrated (57)

Zinc Plating. E. I. du Pont de Nemours and Company, Inc., The R. & H. Chemicals Department, Wilmington, Del. Complete booklet on "Duozinc" process for protection of iron and steel; gives full data on preparation, solutions, control and maintenance, analysis, tests, applications, etc. (58)

Heating Units. General Electric Company, Schenectady, N. Y. Bul. CED-571, "Calrad" cartridge, strip and electric liquid units. (59)

Silver and Gold Market Review. Handy & Harman, 82 Fulton Street, New York. The eighteenth annual issue, covering the silver and gold situation in the arts and industries during 1933. The pamphlet includes complete statistics and is a mine of valuable data on the market aspects of these precious metals, being prepared by the leading silver dealer of the country. The scope is international, taking in all nations where the economics of silver is important. (60)

The Season's Greetings

Metal Industry wishes to express its thanks to the various companies and individuals who sent greetings, calendars or other tokens at Christmas and New Years, including:

The American Brass Company, Waterbury, Conn.
Apollo Metal Works, La Salle, Ill.
Driver-Harris Company, Harrison, N. J.
General Electric Company, Schenectady.
The B. F. Goodrich Rubber Company, Akron, Ohio.
Handy & Harman, New York.
Mr. and Mrs. George B. Hogaboom, New Britain, Conn.
Irving Trust Company, New York.
Pack-Morin, Inc., New York.
Philadelphia Quartz Company, Philadelphia, Pa.
Tutrone Printing Company, New York.
United Engineering and Foundry Company, Pittsburgh, Pa.
Weisberg and Greenwald, Inc., New York.

News of Associations

American Society for Testing Materials

Headquarters of the American Society for Testing Materials have been moved from the Engineers' Club Building, Philadelphia, Pa., to more adequate offices in the Atlantic Building, 260 South Broad Street, same city.

The new rooms comprise about 2600 sq ft. to be devoted to offices, reception room, members' lounge and board room, and 850 sq. ft. for storage, shipping and general work room.

1934 Regional Meeting

At the 1934 Regional Meeting, which is to be held in Washington on Wednesday, March 7, a Symposium on the Outdoor Weathering of Metals and Metallic Coatings will be held. This meeting, together with the group meetings of A S.T.M. committees which will be in progress throughout the five days of the week beginning March 5, will be held in the Wardman Park Hotel, Washington, D. C.

General arrangements for the Regional Meeting and group meetings of committees are in charge of a local committee headed by A. C. Fieldner, Chief Engineer, Experiment Stations Division, U. S. Bureau of Mines.

A Symposium on Outdoor Weathering of Metals and Metallic Coatings is being sponsored jointly by Committee A-5 on Corrosion of Iron and Steel and Committee B-3 on Corrosion of Non-Ferrous Metals and Alloys. These committees have appointed the following program committee:

Chairman, F. F. Farnsworth, Bell Telephone Laboratories, Inc.
W. H. Finkeldey, Metallurgist, Singmaster & Breyer.
C. L. Hippensteel, Technical Staff, Bell Telephone Laboratories, Inc.
R. F. Passano, Research Laboratories, American Rolling Mill Co.
H. S. Rawdon, Chief, Division of Metallurgy, U. S. Bureau of Standards.
Sam Tour, Vice-President, Lucius Pitkin, Inc., New York.

The broad purpose of the symposium will be to make conveniently available so that its use may be widespread the engineering information developed in the extensive series of outdoor tests of materials under the sponsorship of Committees A-5 and B-3.

Committee B-3 on Corrosion of Non-Ferrous Metals and Alloys which was organized in 1922 also has done a great deal of work in developing reliable information and data in its field. It has under way at the present time a most elaborate research program. It has been roughly estimated that for the past six years during which extensive tests have been performed and preparations made for the unparalleled series of exposure tests now under way, leading American companies who have supported the work have contributed $200,000 in the form of materials, labor, special testing equipment and funds. The present program involves atmospheric corrosion tests, liquid corrosion, such as that caused by acids, soda, salt, etc., and galvanic and electrolytic corrosion caused by contact of dissimilar metals.

American Foundrymen's Association

The Nonferrous Division of the American Foundrymen's Association (headquarters, 222 West Adams Street, Chicago, Ill.) has named a nominating committee which has chosen the following candidates for Division officers to serve for terms of two years, beginning 1934:

For chairman, **Jerome Strauss**, Vanadian Corporation of America, Bridgeville, Pa.

For vice chairman, **J. W. Bolton**, Lunkenheimer Co., Cincinnati, Ohio.

Candidates nominated for Advisory Committee membership:

E. H. Dix, Jr., Aluminum Company of America, New Kensington, Pa.

W. Romanoff, H. Kramer Company, Chicago, Ill.

C. M. Saeger, Jr., U. S. Bureau of Standards, Washington, D. C.

Letter ballots will be sent to the Division members early in 1934.

Institute of Metals Division

The following have been nominated for offices in the Institute of Metals Division of the A. I. M. E., for the term starting in 1934:

J. L. Christie, chairman.
W. A. Scheuch, vice-chairman.
W. M. Peirce, vice-chairman.
E. M. Wise, secretary.

Executive Committee: J. A. Gann, G. O. Hiers, R. H. Leach.

Major Meetings in 1934

American Electroplaters' Society, Annual Convention, Detroit, Mich., June 11-14.

American Foundrymen's Association, Annual Convention, Philadelphia, Pa., October 22-26.

Institute of Metals Division, A.I.M.E., Annual Meeting, New York, February 19-22.

The Electrochemical Society, Spring Meeting, Asheville, N. C., April 26-28; Fall Meeting, New York, September 27-29.

American Society for Testing Materials, Regional and Group meetings, Washington, D. C., March 5-9; Annual Meeting, Atlantic City, N. J., June 25-29.

National Association of Waste Material Dealers, Inc., Annual Convention, New York or Atlantic City, March 19-21.

British Institute of Metals, 26th Annual General Meeting, London, England, March 7-8; General Meeting and Annual May Lecture, May 9; Meeting, September.

Personals

C. L. Anger Joins Udylite

C. L. Anger, well-known plating engineer, has joined the sales-service staff of the Udylite Process Company, Detroit, Mich. Mr. Anger's headquarters will be the recently established Cleveland branch office. (See page 30.)

C. L. ANGER

Mr. Anger brings to Udylite broad experience in the plating industry. Shortly after graduating from the chemical engineering department of the University of Michigan in 1919, he entered the field of electroplating by joining the C. G. Spring and Bumper Company, Detroit. Mr. Anger was placed in charge of finishing and chemical processes, including the plating, rustproofing, polishing, enameling and heat treating departments of the bumper plant.

Following his connection with C. G. Spring and Bumper, he became associated in turn with C. M. Hall Lamp Company, General Chromium Corporation, and Detroit Plating Industries. His positions with these concerns were similar to that held with C. G. Spring.

In 1929, Mr. Anger left Detroit Plating Industries and made his first connection with a plating supply house when he joined the Chicago office of The Hanson-Van Winkle-Munning Company, Matawan, N. J., as service engineer. He continued in the latter capacity for a year prior to joining Udylite.

Oliver J. Sizelove, widely known electroplating technician, has joined the Frederick Gumm Chemical Company, Inc., 113-115 36th Street, Union City, N. J., as general sales representative, and to act also in an advisory capacity. Mr. Sizelove was formerly for twelve years with August Goertz and Company, Inc., Newark, N. J., as finishing supervisor. He has been an associate editor of **Metal Industry** for some years. The Gumm company manufactures and deals in industrial finishing supplies, including the "Clepo" brand of cleaners.

W. M. Horton, of Lakewood, Ohio, has been appointed factory manager of the Ferry Cap and Screw Company, Cleveland, Ohio. For the past 15 years he has been identified with the Kirk-Latty division of the Lamson and Sessions Company and recently was assistant director of operations. He is a member of the Society of Automotive Engineers and the American Society of Mechanical Engineers.

Dr. R. W. Mitchell, technical director of the Dif Corporation and Magnus Chemical Company, South Avenue, Carwood, N. J., sailed December 10th for a six-week business trip through England, France and Italy. He will visit industrial plants and make a study of cleaning equipment, materials and methods of leading European manufacturers of metal goods and allied lines. Dr. Mitchell will be introduced and assisted by Marcel Boss, a Paris manufacturer of industrial cleaning equipment and machinery, who is agent for Magnus Materials in Europe.

E. B. Snarey, director of purchases for some years past at Mueller Brass Company, Port Huron, Mich., severed his connections with that company on December 23. Mr. Snarey will be engaged in the promotion of non-ferrous products for the Central Steel and Wire Company, with office at Detroit, Mich.

Major R. A. Bull has been engaged by the Ajax Electrothermic Corporation, Ajax Park, Trenton, N. J., to devote part time as consultant and midwest representative, maintaining an office at 541 Diversey Parkway, Chicago, Ill. Major Bull is a past president of the American Foundrymen's Association and received the Seaman gold medal for his contributions to foundry practice. He holds membership on numerous committees of the American Society for Testing Materials, the American Institute of Mining and Metallurgical Engineers, and many others. He will continue his work as a consultant on steel castings, in which he has been exclusively occupied since the Electric Steel Founders' Research Group was dissolved.

Arnold Lenz, assistant manufacturing manager of the Chevrolet Motor Company, Flint, Mich., has been awarded the honorary degree of Doctor of Engineering by the University of Aachen, Germany, for his contributions to the foundry industry, particularly in automotive work. Dr. Lenz was born in Germany, came here at 14, and started his career with the Browning Foundry Company, Ravenna, Ohio, in 1908. He has since been with Alliance Brass and Bronze Company, Ryder Brass Foundry Company, American Range, Buick; and Aluminum Casting Company. He rejoined General Motors in 1919 and has been there ever since, holding management positions in several of its subsidiaries.

Wilfred S. McKeon, president of Sulphur Products Company, Inc., Greensburg, Pa., who has been seriously ill with respiratory grippe, is now reported past the crisis, and looking forward to a trip south for convalescence. After a period in Florida, "Liquid Sulphur Mac," as he is familiarly known to his friends in the trade, expects to be making his calls before long.

Charles F. Norton, formerly vice-president and general manager of the Howell Electric Motors Company, who recently became associated with The Louis Allis Company, Milwaukee, Wis., was recently appointed as general sales manager of The Louis Allis Company.

James G. Vail

The new Chemical Industry Medal of the American Section of the Society of Chemical Industry was presented on November 3, 1933, to James G. Vail of the Philadelphia Quartz Company, Philadelphia, Pa., at a meeting held jointly at The Chemists' Club, New York City, with the American Chemical Society, the Electrochemical Society, and the Societe de Chimie Industrielle.

JAMES G. VAIL

The Chemical Industry Medal was instituted by the Society of Chemical Industry for award annually to a person making a valuable application of chemical research to industry. Mr. Vail is the first recipient of this award, in recognition of his work on sodium silicates in industry. At the presentation he gave an address on the subject of waterglass, entitled "The Culture of Certain Silicate Gardens". (Silicates are widely used in metal cleaning.)

James G. Vail became a member of the Chemical Department of the Philadelphia Quartz Company in 1905. Since that date he has held numerous offices

in this organization and is now a vice-president and chemical director.

He graduated from Westtown School in 1904, and for a number of years he has served on its executive committee. He continued his studies as a special student at the Technische Hochschule at Darmstadt, Germany, the University of Pennsylvania, and Harvard University. Aside from his chemical work, Mr. Vail served with the American Friends Service Committee for the relief of famine in Germany in 1919-20, in charge of the receipt and distribution of supplies and also the feeding of children.

In technical circles he is well known due to his activity in American scientific organizations and through his many contacts abroad.

As the author of the American Chemical Society Monograph "Soluble Silicates in Industry", he is recognized as the leading authority on this subject. Credited with a great many articles dealing with technology of sodium silicate and the methods by which it is made to serve industry, Mr. Vail refuses to write for publication or to lecture except when he feels he has something of importance to say.

Obituaries

George Krouse

George Krouse, well known brass founder of Jersey City, N. J., died December 6, 1933, of a lung embolism. Mr. Krouse, who was 77, had been in apparently good health, aside from a slight cold, half an hour before his death.

Mr. Krouse was born at Suffern, N. Y., in 1856, worked there on his father's farm summers, and in winters worked at the Blauvelt Plow Works, where he learned foundry work. Later he was with the Ramapo Car Wheel foundry at Ramapo, N. Y., as a moulder, and after that he spent some time working at Dayton, Ohio. He founded the business which still bears his name at 150 Morgan Street, Jersey City, in 1887, and it grew into one of New Jersey's best known plants. Mr. Krouse attended to the business personally until the very day he died.

Mr. Krouse was for many years a member of the American Foundrymen's Association, the Newark Foundry Association, and the Metropolitan Foundrymen's Association. He was also active in religious affairs, and was an ardent sportsman, concentrating on hunting and fishing. A great many business and social acquaintances and friends have expressed their profound regret at the loss of George Krouse.

Mr. Krouse is survived by his widow and a daughter.

Russell H. Colby

Russell H. Colby, president of the Aurora Metal Company, Inc., Aurora, Ill., died at that city November 24, 1933, after a brief illness. He was 67 years old.

Mr. Colby was born at Boston, Mass., and was educated at the Massachusetts Institute of Technology. In 1888 he went to Aurora and joined the Chicago and Aurora Smelting and Refining Company. When this company was merged with American Smelting and Refining Company in 1899 and was shut down, Mr. Colby and his associates organized the Aurora Metal Company, of which he became president. The firm manufactures babbitt metal, piston rod packings, and, during the past eight years, has developed a process of die casting aluminum bronze.

Mr. Colby is survived by his widow.

William Shaw, Sr.

William Shaw, Sr., veteran Newark, N. J., foundryman and manufacturer, died December 9, 1933, at his home, 58 Linden Avenue, Irvington, N. J., aged 65.

Mr. Shaw and his brother, Joseph Shaw, founded the Shaw Brothers Foundry in Newark, in 1915. In 1920 this company was consolidated with the Phoenix Brass Foundry. Mr. Shaw was a director of the company and superintendent of the foundry department.

Surviving, in addition to the brother, are his widow, Mrs. Ida M. B. Shaw; four sons, Jesse, William, Jr., Clifford and Alan, all of Irvington; and two daughters.

Joseph Binks

Joseph Binks, founder of the Binks Spray Equipment Company, now the Binks Manufacturing Company, Chicago, Ill., died November 20, 1933, at Oak Park, Ill., aged 83 years. Mr. Binks was a pioneer Illinois manufacturer, and was regarded as an authority on steam appliances. He developed a type of spray equipment and founded his company to produce it. He retired in 1928, at which time the firm name was changed.

John M. Howard

John M. Howard, for nearly 40 years a jewelry manufacturer at Providence, R. I. died there November 27, 1933, aged 50 years. He was manager and treasurer of G. Klein and Son, with whom he had been associated for 22 years. Mr. Howard was born in Providence, and learned the jeweler's trade as a boy.

William J. Feeley

William J. Feeley, president of the W. J. Feeley Inc., Providence, R. I., which is said to be the oldest United States manufacturer of ecclesiastical goods, and was at one time the largest, died at his home in Providence on December 15, 1933, after a prolonged illness. He was 78 years of age.

Mr. Feeley was born in Providence. As a boy he became associated with the business which bears his name, which had been established in 1870, by his father, Michael Feeley. The company was known not only throughout religious circles but to dealers in the United States, and parts of Europe, South America and Canada, where in almost every diocese there are today sacred vessels bearing the Feeley imprint. W. H. M.

Everett Morss

Everett Morss, president of the Simplex Wire and Cable Company, Boston, Mass., died December 27, 1933, aged 68.

Mr. Morss was very prominent in the insulated wire industry. He was president of the Franklin Foundation. During the last war he was on the priorities committee of the War Industries Board, and chief of the brass section. He was a graduate of Massachusetts Institute of Technology, 1885, and of Tufts College.

Mr. Morss is survived by his widow, a daughter and two sons.

A. L. Waltensperger

Alexander L. Waltensperger, secretary and treasurer of the Sherwood Brass Works, Detroit, Mich., died December 23, 1933. He was born in Detroit in 1874, and founded the Sherwood Brass Works with William Sherwood in 1903. He had been active in its affairs since its inception.

His widow, a son, two daughters, two brothers and a sister survive.—F. J. H.

Edward L. Ashley

Edward L. Ashley, veteran brass mill engineer and former mechanical superintendent for the Scovill Manufacturing Company, Waterbury, Conn., died at that city on December 27, 1933, aged 83. A more complete obituary will appear in the next issue.

P. R. Diamond

P. R. Diamond, chairman of the board of directors of the Canadian Bronze Company, Ltd., Montreal, Canada, died there December 3, 1933, aged 66.

Joseph Gerson

Joseph Gerson, a partner in the Gerson-Carey Brass Foundry, Lansing, Mich., died recently. Mr. Gerson was born in Paterson, N. J., and spent the early part of his life in Pennsylvania.

Industrial and Financial News

Electrical Manufacturers Confer with T. V. A.

A project which is designed to expand greatly the consumption of electric power in the area of the Tennessee Valley Authority by making available to residents and farmers there a very large amount of electrical equipment is under consideration by officials of the T. V. A., following creation by the President of the Electric Home and Farm Authority. Electrical manufacturers have conferred with government officials toward this end, and the result may be a very large manufacturing program to make available the appliances and other equipment. A committee representing the manufacturers and appointed by the National Electric Manufacturers Association includes A. G. Kimbell, president of Landers, Frary and Clark, New Britain, Conn.; L. H. Curtice and T. K. Quinn of General Electric; A. L. Lindemann of A. J. Lindemann and Hoverson, Milwaukee, Wis.; E. G. Biechler of Frigidaire Corporation, Detroit, Mich.; N. G. Symonds of Westinghouse.

New Udylite Sales Branch Opened in Cleveland

In order to facilitate service to customers in the area of which the center is Cleveland, Ohio, the Udylite Process Company, Detroit, Mich., has opened a branch for sales and service at 708 Keith Building, Cleveland. J. S. Hofman will be in charge of the new branch and will have as his assistants L. J. George of the Udylite service and C. L. Anger, of the supply division. All the men are widely known in plating circles and, with the exception of Mr. Anger, have been with Udylite for a number of years. (See p. 30).

Complete stocks of Udylite materials and supplies will be maintained in Cleveland for the convenience of licensees of the Udylite cadmium plating process.

DuPont Buys Carrier

E. I. du Pont de Nemours & Company, Inc., Wilmington, Del., announces the purchase of the metal degreasing business of the **Carrier Engineering Corporation**, Newark, N. J. This business formerly was conducted by the Carrier Metal Cleaning Division. The transaction involves the sale of patents, trademarks and good will of the Carrier Vapor Degreaser machine and of the well-known solvent, Cecolene, used in connection therewith. **R. & H. Chemicals Department** of du Pont will continue to manufacture Cecolene, and is prepared to supply this solvent in any quantities to present users of Carrier Vapor Degreaser equipment. Future orders for Cecolene should be sent to The R. & H. Chemicals Department at Wilmington, or to its district offices.

International Silver not Advancing Prices

C. R. Gardinor, president of the International Silver Company, Meriden, Conn., issued a statement on December 26 denying a report that the company had increased its prices as a result of the new Federal silver program. He said:

"The statement to the effect that International Silver Company had announced increases in the prices of its products, due to the announcement made by the government of its silver program, is without foundation. No such announcement was made.

"It is our understanding that the administration's program on silver applies to silver still in the ground and will only affect the price of silver used in the arts in an indirect way. Consequently, the prices of our merchandise will be controlled by the official price of silver bullion and not by the government's established price."

Tin Robberies in New York

Four bandits invaded the premises of Hendricks Brothers, metal dealers, 49 Cliff Street, New York, on December 28, bound the employees, and removed 36 pigs of Straits tin valued at about $2,000. They also took a watch and a new overcoat. The robbery came five days after the premises of E. L. Post and Company, 50 Cliff Street, had been entered by thieves after closing time. They took 50 pigs of "Straits Trading Company" tin. It is believed the same persons are responsible for both robberies. Several years ago the Hendricks firm was also robbed of a quantity of metal.

Welding Standards

American Standards Association, 29 West 39th Street, New York, has just approved standards covering generators, transformers and other equipment for arc and resistance welding, the first national standards for this field, and affecting a wide range of industries. They are designed to assure adequate and properly controlled current supply. The committee which formulated the standards was organized in 1931 under joint sponsorship of the A.I.E.E. and the N.E.M.A.

Aluminum Company Wins in Bausch Trust Suit

A jury in Federal court at New Haven, Conn., on December 22 returned a verdict in favor of the Aluminum Company of America, Pittsburgh, Pa., in the $9,000,000 suit brought against the concern by the Bausch Machine Tool Company of Springfield, Mass.

The Bausch company charged that the Aluminum Company, through control of prices, monopoly of raw materials and suppression of independent producers, had caused it to sustain a loss of $3,000,000. Punitive damages of $6,000,000 were also asked. The jury found no evidence of monopolistic tendencies causing the alleged damage.

The suit was filed two years ago and the trial took eleven weeks. The charge of Judge Carll Hincks consumed two and one-half days, and the jury deliberated four and a half hours.

The Baush company is one of a group of three aluminum concerns organized outside of the sixteen companies forming the association of manufacturers in the aluminum industry.

Big Searchlight Order

The Sperry Gyroscope Company, Brooklyn, N. Y., has been awarded a contract by the United States Army Engineers amounting to $2,015,900 for 104 60-inch high intensity anti-aircraft searchlights.

Code Pamphlets Issued

The National Recovery Administration, Washington, D. C., has issued pamphlets giving approved codes of fair competition for the following industries. These are available at 5 cents each from the Superintendent of Documents, Washington, D. C.:

Metal Tank Industry.
Anti-Friction Bearing Industry.
Oxy-Acetylene Industry.

Government to Buy 24½ Million Ounces Silver

An executive order was issued last month by President Roosevelt requiring the Treasury to purchase 24,421,410 ounces of newly mined domestic silver annually, at the statutory price of $1.29 a fine ounce, with one-half this amount to be surrendered by the miners as seigniorage and to cover all charges and expenses. This means that the Government will actually pay the silver producers 64½ cents a fine ounce. One-half of the silver purchased each year will be coined, and the rest will be deposited in the Treasury.

Business Items---Verified

Eagle Lock Manufacturing Company, Hartford, Conn., advanced wages of 800 employees at Terryville, Conn., 10%, to conform to code rate, and making it same as 1929 level.

Martin Sales and Supply Company, Cleveland, Ohio, is now representing **United American Metal Corporation, Standard Rolling Mills, Inc.,** and **Victor Metals Corporation** in sale of various ingot and other forms of metals they produce. **W. H. Martin,** formerly Cleveland representative of **Hewitt Metals Corporation,** is president of the Martin company.

H. O. Swoboda, Inc., has taken larger quarters at 4301-3 Main Street, Pittsburgh, Pa., to provide increased facilities for its work of research and development in connection with industrial problems. Office and laboratory have been combined at the new address.

Aluminum Smelting and Refining Company, Cleveland, Ohio, has appointed B. E. Taylor, Lexington Hotel Building, Detroit, Mich., and J. L. Wenk, 6930 South Shore Drive, Chicago, Ill., as sales representatives for its various grades of remelt aluminum ingot.

Aluminum Specialty Company, Manitowoc, Wis., is building a one-story addition to its plant. It recently took over equipment and business of **Metal Goods Corporation,** St. Louis, Mo.

General Armature Corporation, Lock Haven, Pa., is headed by **M. B. Mervis,** board chairman, and Lou Mervis, president. Company operates tool room and stamping, soldering, plating, polishing, grinding and lacquering departments.

Advance Stove Works, Evansville, Ind., is on full time schedule under reorganized management, headed by **W. H. Boetticherr,** president. Company operates casting shop.

Motor Valve Products Company, Ravena, Ohio, has acquired plant facilities and will begin automobile valve production this month.

Munning and Munning, Inc., manufacturers and distributors of plating and polishing equipment and supplies, have removed its main office and works from Philadelphia, Pa., to 202-208 Emmett Street, Newark, N. J., which it considers the logical center of its eastern markets. The new location provides increased space and improved facilities for sales and service, according to **P. P. Munning,** president.

The Bristol Company, Waterbury, Conn., announces that in order to serve the Canadian market still better, and to expand and consolidate its present Canadian service laboratory of 12 years standing so as to include sales, service and manufacturing, a separate company, **The Bristol Company of Canada, Ltd.,** has been incorporated. Factory and general headquarters will be located at 64 Princess Street, Toronto, Ont., where Bristol recording, indicating and control instruments will be made. **J. S. Mayberry,** graduate engineer of Toronto University, and for 10 years with the parent company, has been appointed manager.

Ault & Wiborg Corporation, New York, announces the removal of its Chicago offices on January 1 to 1240 West Washington Boulevard. In this location they will have larger quarters and better facilities; a larger stock will be carried and prompter service can be rendered in furnishing special materials in all the lines of industrial finishing. With R. J. Hazucha in charge as Chicago district manager, the staff also includes: George B. Lemon, Floyd A. Burns, C. E. Stiers, and R. F. Bell.

Alfred Fisher Furnaces, Inc., has removed its plant to 1822-1836 North Lamon Avenue, Chicago, Ill., from the former location at Cicero, Ill. The company manufactures and is a jobber of various foundry equipment, supplies, refractories, etc.

A cast brass anchor with a two-inch shank and one and one-half inch flukes, to be used as a curtain string pull, is one of the novelties put on the market by the Rolins Company, 31 South Street, New York.

Exposition of Chemical Industries

The Exposition of Chemical Industries was held in New York at the Grand Central Palace during the week of Dec. 4. This Exposition as usual included a considerable variety of equipment of interest to the metal and plating firms and of course a large number of industrial finishes.

The electroplating industry is gradually but steadily moving into the class of chemical industries. For that reason it is worth while for electroplating firms to watch the development of chemical equipment as much of it can be of service to them.

Exhibits of special interest to metal and plating plants were shown by the following firms.

Baker & Company, Newark, N. J. Platinum and platinum metals in a wide variety of forms.

Brown Instrument Company, Philadelphia, Pa. Instruments for scientific control.

Commercial Solvents Company, New York. Solvents of all kinds.

Great Western Manufacturing Company, Leavenworth, Kan. Gyratory screens and mixers.

General Tank Corporation, Kearny, N. J. Tanks for acids and other chemicals.

Hellige, Inc., New York. Comparator sets for pH determination.

Alsop Engineering Company, New York. Mixers and filters for solutions.

Buffalo Foundry and Machine Company, Buffalo, N. Y., General chemical plant equipment such as blowers, exhausters, etc.

General Ceramics Company, New York. Acid-proof equipment, ceramics, stoneware.

Palo-Myers, Inc., New York. Laboratory supplies and equipment.

U. S. Stoneware Company, New York. Acid-proof equipment, ceramics, stoneware.

W. A. Taylor & Company, Inc., Baltimore, Md. Comparators for pH determination.

Hauser-Standard Tank Company, Cincinnati, Ohio. Wooden tanks for every purpose.

Durion Company, Dayton, Ohio. Centrifugal pumps for handling acids and other chemicals.

International Nickel Company, New York. Nickel, nickel alloys and Monel metal.

Foxboro Company, Foxboro, Mass. Recording and control instruments for chemical plants and manufacturing operations.

Spraco, Inc., Summerville, Mass. Powdered spraying equipment.

Bristol Company, Waterbury, Conn. Pyrometers and other manufacturing and chemical control instruments.

Ertel Engineering Corporation, New York. Mixers, pumps, etc. for chemical solutions.

National Engineering Company, Chicago, Ill. "Intensive" mixer for dry chemicals, suitable for foundry sand.

DeLaval Separator Company, New York. Separators and clarifiers for chemicals; filters.

Pangborn Corporation, Hagerstown, Md. Dust-collecting equipment.

T. Shriver and Company, Harrison, N. J. Filter presses for all purposes.

Dow Chemical Company, Midland, Mich. Dow metal (magnesium alloys).

Tolhurst Machine Works, Troy, N. Y. Centrifugals.

Maurice A. Knight, Akron, Ohio. Chemical stoneware.

Oliver United Filters, Inc., New York. Filters.

Leeds & Northrup Company, Philadelphia, Pa. Scientific instruments.

U. S. Bottling Machinery Company, Chicago, Ill. Filters.

Haveg Corporation, Newark, Del. Acid-proof tanks.

Metals and Finishes Shown at Ford Exposition

There was a great variety of nonferrous metals as well as all kinds of finishes for metals at the Ford Motor Company's exposition in New York last month. It showed all or part of every process used in the Ford plants and those of the suppliers of parts and accessories. The 1934 Ford models have more chromium than former models. Other finishes and processes used on Fords are Parkerizing and Bonderizing, lacquering and enameling, nickel plating, and bright polishing of rustless iron and other parts and accessories. Many cast and worked nonferrous metals were on view also. The Exposition was made up of the Ford exhibits together with displays by many companies which supply Ford with equipment and materials. The following are familiar to our readers:

Aluminum Company of America, Pittsburgh, Pa.; Bohn Aluminum and Brass Company, Detroit, Mich.; Bound Brook Oil-Less Bearing Company, Bound Brook, N. J.; Carborundum Company, Niagara Falls, N. Y.; Cleveland Graphite Bronze Company, Cleveland, Ohio; Commercial Solvents Corporation, Terre Haut, Ind.; Devilbiss Company, Toledo, Ohio; E. I. du Pont de Nemours and Company, Detroit, Mich.; The B. F. Goodrich Rubber Company, Akron, Ohio; MacFarland Manufacturing Company, Inc., with Hammond Machinery Builders, Inc., Kalamazoo, Mich., co-operating; The Matchless Metal Polish Company, Glen Ridge, N. J., with Advance Polishing Wheels, Inc., Chicago, Ill., co-operating; McAleer Manufacturing Company, Detroit, Mich.; Norton Company, Worcester, Mass.; Parker Rust Proof Company, 2177 East Milwaukee Street, Detroit, Mich.; Electro-Metallurgical Company, 30 East 42nd Street, New York.

Aluminum. Hungarian industrialists plan erection of two plants for aluminum production, to provide an outlet for bauxite, a native product, according to United States Clerk J. J. Ronto at Budapest, Hungary.

New Incorporations

Sanymetal Products Company, Inc., Cleveland, O.; capital, 75,000; to manufacture metal goods; succeeds company of same name with plant at 1705 Urbana Road; by C. J. Daugherty and K. W. Benham.

P. & P. Detinning Corporation, 147th Street and Ashland Avenue, Harvey, Ill.; to deal in white metals; by Samuel Plame and associates.

Commercial Foundry Company, New Britain, Conn., in operation for some years, has now incorporated, headed by F. Elkwurtzel, 195 Kelsey Street. Company operates complete nonferrous foundry.

Gabriel-Noble Manufacturing Company, 5465 Lincoln Avenue, Detroit, Mich.; $10,000 capital; manufacture, process and machine metal products; operate machine shop, tool room, casting and stamping departments; by G. H. Noble, 2561 Seminole Avenue, Detroit. Company is interested in purchase of die casting equipment.

News From Metal Industry Correspondents

New England States

Waterbury, Connecticut

January 2, 1934.

The decline in the business of local brass plants, which became noticeable a month ago after a surprisingly busy summer and early fall, is still continuing, although not dropping so rapidly. It is generally believed that after the first of the year the trend will once more be upward. It is understood that many of those laid off by the local plants in the last two months were men that had not been needed but had been kept on as the plants did not want to make the unemployment situation worse than necessary. Starting of several CWA projects, it is believed, relieved the unemployment situation so that the factories felt they could at last let these men go.

Connecticut Manufacturers Association claims credit for the proposal to bring all metal manufacturing under one general code. **John H. Goss,** vice-president of the **Scovill Manufacturing Company,** served as a member of the industrial advisory board that considered it. **The Clock Manufacturers Association of America,** in which the local clock concerns are represented, submitted a code early in September but has been asked to rewrite it. It needed drastic changing before officials would even give it a public hearing. It is the only major code affecting Connecticut industries on which this step has not been taken.

The city has agreed not to press immediately its claim for $55,000 back taxes due from the **Beardsley and Wolcott Manufacturing Company,** now in the hands of receivers, as doing so would require foreclosing on the plant and throwing from 100 to 200 people out of work. The court allowed several claims for goods ordered prior to the receivership which were received and used by the receiver.

Patent Button Company has won its suit against Gusie Shamus and others for the right of way to pass over land owned by the latter.

Officials of **Waterbury Clock Company** have been summoned to New York by the federal regional labor board to thrash out differences with their employees. **Samuel E. Beardsley,** general secretary of the **International Jewelry Workers,** with which many of the employees are affiliated, charged last month that the company is violating Section 7 of the NIRA by attempting to obstruct employees organizing through representatives of their own chosing, referring to the company union which the concern has started. He charged that many of those who were laid off for over a month, early last month, had been offered jobs if they would drop from the Jewelry Workers union and join the company union.

John A. Coe, president, **American Brass Company,** has been appointed to a committee by President Henry Trumbull of the state Chamber of Commerce to draft a referendum for submission to the entire membership on the question of the monetary policies of the federal government. W. R. B.

Connecticut Notes

January 2, 1934.

HARTFORD—E. Kent Hubbard, president, **Connecticut Manufacturers Association,** urges all members to abstain from criticizing the President's monetary policy at present. Unsound policies should be criticized, he says, and all deplore any move that might end in fiat money, but he has seen nothing in any of the President's pronouncements that leads him to think he contemplates starting the printing presses. He says that until two months ago it was the fashion to applaud heartily every Presidential move, but recently it has become the fashion to denounce him in most of his moves. Until he shows that he is for unsound money he should receive the support of every citizen, he says.

United States Supreme Court has agreed to review an appeal brought by the **Arrow-Hart and Hegeman Electric Company** of this city from a decision of a lower court that it represents an illegal consolidation and must be dissolved. It has total capitalization of $4,580,000. Company holds the public has suffered no injury through the con-

solidation, but has been benefitted by economies resulting in lower prices. It is meeting competition from other concerns, and so does not constitute a monopoly, it holds.

An explosion in the switchboard room of the **Jacobs Manufacturing Company,** manufacturers of drill chucks, blew out a wall of the plant. No one was injured.

TORRINGTON—Sterry Hunt Childs, former treasurer of the **Hendey Machine Company,** was convicted of embezzling over $200,000 from the company, and given a sentence of from six to ten years in prison last month. He was arrested last spring. Most of the sums were obtained through checks drawn on Chase National Bank of New York. Through his position Mr. Childs was able to juggle the books so that the shortage was not discovered for several years. **John A. Coe,** president of the company, also president of the **American Brass Company,** testified at the trial.

Torrington Company declared a dividend of 75 cents, payable January 1, compared with 50 cents paid each previous quarter this year. Torrington has purchased the **Westfield Manufacturing Company,** Westfield, Mass. It will pay 37½ cents on the dollar on claims, which total to $843,652. Business will be continued in Westfield. Westfield was formed in 1915 to take over manufacture of Pope and Columbia bicycles from Pope Manufacturing Company, Hartford. It also manufactured baby carriages and screw machine products. The sale of the company was ordered by the superior court.

BRIDGEPORT—DuPont's program to offer employees a week's vacation with pay will be extended to the 2,300 employees of **Remington Arms Company.** Employees who have been on the payrolls for one year will be entitled to a vacation at the convenience of the employee.

MERIDEN — International Silver Company declared a $1 dividend on its cumulative 7% preferred, payable January 1, the first payment since last February. The rate last year was $1 quarterly.

NEW HAVEN—J. J. Pelley, president of the New Haven, says reconditioning of its lines will be started as a result of the $3,500,000 loan made to it by PWA. Cars will be air-conditioned, and metal swinging doors, metallic steam connections, electric light regulators, generators and water tanks will be installed.

WINSTED—Over 2,000 persons are now employed in local factories, according to the **Manufacturers Association,** some being as follows: **W. L. Gilbert Clock Company,** 500; **Fitzgerald,** 200; **Winsted Edge Tool Works,** 50; **Winsted Hardware Manufacturing Company,** 40; **Union Pin Company,** 40.

THOMASTON—Joseph H. Walcott, 43, plant engineer of the **Seth Thomas Clock Company,** died at his home here last month. He was a native of Danvers, Mass., and had worked with the **Heiburn-Thompson Company,** Salem, Mass., and the **Graton and Knight Manufacturing Company,** Worcester.

STAMFORD—Yale and Towne declared a common dividend of 15 cents, payable January 2, the same amount paid during the past two years.

W. R. B.

Providence, Rhode Island

January 2, 1934.

Industry here enters 1934 in an optimistic spirit. Industrial surveys and reports indicate improved general conditions, with the single exception of building, which continues to lag. Particularly noticeable in December were gains in employment and payrolls, while retail sales were nearly 20% above the preceding month.

The Association of Gold and Silver Refiners has been formed to promote the interests of that group and to cooperate with the **Council of Jewelry and Allied Trades. Albert A. Remington,** of Horace Remington and Sons Company, is chairman.

At the December meeting the Jewelers' Board of Trade elected **Sydney Y. Ball** of the Ball Company, Chicago, to serve for two years as a director.

The Metal Finding Manufacturers' Association held its regular monthly meeting December 6.

Edward A. Johnson, 31 Fremont street, Warrenton, Mass., has filed information that he is owner of the **Universal Plating Company,** 107 Friendship Street, Providence.

Edward Company, manufacturing jewelers at 185 Eddy Street is conducted by **Edward Dizazzo.**

Albert Hailworth of Longmeadow, Warwick, is proprietor of the **Providence Enamel Company,** 456 Fountain Street, Providence.

L. & B. Jewelry Manufacturing Company has filed notice of a change in authorized capital from $25,000 to 100 no par shares.

Austin J. Smith and **Paul T. Smith** are owners of **Quaker Plating Company,** 109 Friendship Street.

Venetian Jewelry Company, 140 Orange Street, is owned by Giovanni, Salvatore, Anthony and Mario Ficocelli and John Gautier.

A dividend on capital stock of **Nicholson File Company** has been declared, payable January 2.

American Screw Company declared a dividend of 20 cents a share, payable January 2.

W.H.M.

Middle Atlantic States

Central New York

January 2, 1934.

Aroused by what they claim is the consistent ignoring by **James H. Rand, Jr.,** president and chairman of the board of **Remington Rand, Inc.,** of letters from George J. Bowen, vice-president of the International Machinists Union, representative of the union workers, three Ilion labor unions comprising the organized employees of the local Remington plant voted to strike at a meeting held December 24. As this correspondence was mailed, the polishers and moulders had not joined the other three Ilion unions in the strike movement. Pending their action, the strike was not in effect. The purpose of the vote was to induce Mr. Rand to meet officials of the organizations involved for the purpose of discussing wages and working conditions. It was for the same purpose that Mr. Bowen's letters had been written. The labor organizations in Syracuse, Norwood, O., Middletown, Conn., and Cambridge, Mass., were also voting on whether or not to strike.

The executive board of the Ilion labor organization said that **A. M. Ross,** manager of the Ilion plant, has always met shop committees, but that the board had said "questions involved now are national ones, and involve all employees of Remington Rand; consequently they must be taken up with Mr. Rand or by someone delegated by him."

Utica Brass Works, Utica, has newly redecorated its show rooms, and reports Christmas trade was brisk.

At a conference held in Rome December 8, officials of the reorganized **Rome Company,** of which **H. T. Dyett,** is board chairman, announced that several former employees of the **General Cable Corporation** will soon become active in the Rome Company. Among these will be **Clarence R. Keeney,** former sales manager of the **Rome Wire Company; A. D. Ross Fraser, Paul Mueller** and **C A. Scott. Harry W. Barnard,** formerly of the Rome Wire and General Cable, is president of the new concern. It was announced that new line of metal beds will soon be on display in Rome. **Norman Bel Geddes,** designer for the Rome concern, also attended the conference. It is understood this company is considering the manufacture of copper wire.

Manufacture of a new and revolutionary automotive air compressor has resulted in stepping the sales volume of the **Brunner Manufacturing Company,** Utica, up to a new peak. It is made partly of bronze.

Willard D. Ackley, 64, president and general manager of the **Union Fork and Hoe Company,** died of heart trouble at his home in Utica, Christmas Eve. The factory is in Frankfort, N. Y.

E. K. B.

Newark, New Jersey

January 2, 1934.

Vice-Chancellor Berry has appointed **Herbert W. Royal** temporary receiver for the **Inkpak Pen Corporation,** fountain pen makers, 451 Jefferson Street, Orange, N. J. Insolvency was charged; assets were listed as about $3,500, while

Metals and Finishes Shown at Ford Exposition

There was a great variety of nonferrous metals as well as all kinds of finishes for metals at the Ford Motor Company's exposition in New York last month. It showed all or part of every process used in the Ford plants and those of the suppliers of parts and accessories. The 1934 Ford models have more chromium than former models. Other finishes and processes used on Fords are Parkerizing and Bonderizing, lacquering and enameling, nickel plating, and bright polishing of rustless iron and other parts and accessories. Many cast and worked nonferrous metals were on view also. The Exposition was made up of the Ford exhibits together with displays by many companies which supply Ford with equipment and materials. The following are familiar to our readers:

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Aluminum. Hungarian industrialists plan erection of two plants for aluminum production, to provide an outlet for bauxite, a native product, according to United States Clerk J. J. Ronto at Budapest, Hungary.

New Incorporations

Sanymetal Products Company, Inc., Cleveland, O.; capital, 75,000; to manufacture metal goods; succeeds company of same name with plant at 1705 Urbana Road; by C. J. Daugherty and K. W. Benham.

P. & P. Detinning Corporation, 147th Street and Ashland Avenue, Harvey, Ill.; to deal in white metals; by Samuel Plame and associates.

Commercial Foundry Company, New Britain, Conn., in operation for some years, has now incorporated, headed by F. Elkwurtzel, 195 Kelsey Street. Company operates complete nonferrous foundry.

Gabriel-Noble Manufacturing Company, 5465 Lincoln Avenue, Detroit, Mich.; $10,000 capital; manufacture, process and machine metal products; operate machine shop, tool room, casting and stamping departments; by G. H. Noble, 2561 Seminole Avenue, Detroit. Company is interested in purchase of die casting equipment.

News From Metal Industry Correspondents

New England States

Waterbury, Connecticut

January 2, 1934.

The decline in the business of local brass plants, which became noticeable a month ago after a surprisingly busy summer and early fall, is still continuing, although not dropping so rapidly. It is generally believed that after the first of the year the trend will once more be upward. It is understood that many of those laid off by the local plants in the last two months were men that had not been needed but had been kept on as the plants did not want to make the unemployment situation worse than necessary. Starting of several CWA projects, it is believed, relieved the unemployment situation so that the factories felt they could at last let these men go.

Connecticut Manufacturers Association claims credit for the proposal to bring all metal manufacturing under one general code. **John H. Goss,** vice-president of the **Scovill Manufacturing Company,** served as a member of the industrial advisory board that considered it. **The Clock Manufacturers Association of America,** in which the local clock concerns are represented, submitted a code early in September but has been asked to rewrite it. It needed drastic changing before officials would even give it a public hearing. It is the only major code affecting Connecticut industries on which this step has not been taken.

The city has agreed not to press immediately its claim for $55,000 back taxes due from the **Beardsley and Wolcott Manufacturing Company,** now in the hands of receivers, as doing so would require foreclosing on the plant and throwing from 100 to 200 people out of work. The court allowed several claims for goods ordered prior to the receivership which were received and used by the receiver.

Patent Button Company has won its suit against Gusie Shamus and others for the right of way to pass over land owned by the latter.

Officials of **Waterbury Clock Company** have been summoned to New York by the federal regional labor board to thrash out differences with their employees. **Samuel E. Beardsley,** general secretary of the **International Jewelry Workers,** with which many of the employees are affiliated, charged last month that the company is violating Section 7 of the NIRA by attempting to obstruct employees organizing through representatives of their own chosing, referring to the company union which the concern has started. He charged that many of those who were laid off for over a month, early last month, had been offered jobs if they would drop from the Jewelry Workers union and join the company union.

John A. Coe, president, **American Brass Company,** has been appointed to a committee by President Henry Trumbull of the state Chamber of Commerce to draft a referendum for submission to the entire membership on the question of the monetary policies of the federal government. W. R. B.

Connecticut Notes

January 2, 1934.

HARTFORD—E. Kent Hubbard, president, **Connecticut Manufacturers Association,** urges all members to abstain from criticizing the President's monetary policy at present. Unsound policies should be criticized, he says, and all deplore any move that might end in fiat money, but he has seen nothing in any of the President's pronouncements that leads him to think he contemplates starting the printing presses. He says that until two months ago it was the fashion to applaud heartily every Presidential move, but recently it has become the fashion to denounce him in most of his moves. Until he shows that he is for unsound money he should receive the support of every citizen, he says.

United States Supreme Court has agreed to review an appeal brought by the **Arrow-Hart and Hegeman Electric Company** of this city from a decision of a lower court that it represents an illegal consolidation and must be dissolved. It has total capitalization of $4,580,000. Company holds the public has suffered no injury through the con-

solidation, but has been benefitted by economies resulting in lower prices. It is meeting competition from other concerns, and so does not constitute a monopoly, it holds.

An explosion in the switchboard room of the **Jacobs Manufacturing Company,** manufacturers of drill chucks, blew out a wall of the plant. No one was injured.

TORRINGTON—Sterry Hunt Childs, former treasurer of the **Hendey Machine Company,** was convicted of embezzling over $200,000 from the company, and given a sentence of from six to ten years in prison last month. He was arrested last spring. Most of the sums were obtained through checks drawn on Chase National Bank of New York. Through his position Mr. Childs was able to juggle the books so that the shortage was not discovered for several years. **John A. Coe,** president of the company, also president of the **American Brass Company,** testified at the trial.

Torrington Company declared a dividend of 75 cents, payable January 1, compared with 50 cents paid each previous quarter this year. Torrington has purchased the **Westfield Manufacturing Company,** Westfield, Mass. It will pay 37½ cents on the dollar on claims, which total to $843,652. Business will be continued in Westfield. Westfield was formed in 1915 to take over manufacture of Pope and Columbia bicycles from Pope Manufacturing Company, Hartford. It also manufactured baby carriages and screw machine products. The sale of the company was ordered by the superior court.

BRIDGEPORT—DuPont's program to offer employees a week's vacation with pay will be extended to the 2,300 employees of **Remington Arms Company.** Employees who have been on the payrolls for one year will be entitled to a vacation at the convenience of the employee.

MERIDEN — International Silver Company declared a $1 dividend on its cumulative 7% preferred, payable January 1, the first payment since last February. The rate last year was $1 quarterly.

NEW HAVEN—J. J. Pelley, president of the New Haven, says reconditioning of its lines will be started as a result of the $3,500,000 loan made to it by PWA. Cars will be air-conditioned, and metal swinging doors, metallic steam connections, electric light regulators, generators and water tanks will be installed.

WINSTED—Over 2,000 persons are now employed in local factories, according to the **Manufacturers Association,** some being as follows: **W. L. Gilbert Clock Company,** 500; **Fitzgerald,** 200; **Winsted Edge Tool Works,** 50; **Winsted Hardware Manufacturing Company,** 40; **Union Pin Company,** 40.

THOMASTON—Joseph H. Walcott, 43, plant engineer of the **Seth Thomas Clock Company,** died at his home here last month. He was a native of Danvers, Mass., and had worked with the **Heiburn-Thompson Company,** Salem, Mass., and the **Graton and Knight Manufacturing Company,** Worcester.

STAMFORD—Yale and Towne declared a common dividend of 15 cents, payable January 2, the same amount paid during the past two years.

W. R. B.

Providence, Rhode Island

January 2, 1934.

Industry here enters 1934 in an optimistic spirit. Industrial surveys and reports indicate improved general conditions, with the single exception of building, which continues to lag. Particularly noticeable in December were gains in employment and payrolls, while retail sales were nearly 20% above the preceding month.

The Association of Gold and Silver Refiners has been formed to promote the interests of that group and to cooperate with the **Council of Jewelry and Allied Trades. Albert A. Remington,** of Horace Remington and Sons Company, is chairman.

At the December meeting the Jewelers' Board of Trade elected **Sydney Y. Ball** of the Ball Company, Chicago, to serve for two years as a director.

The Metal Finding Manufacturers' Association held its regular monthly meeting December 6.

Edward A. Johnson, 31 Fremont street, Warrenton, Mass., has filed information that he is owner of the **Universal Plating Company,** 107 Friendship Street, Providence.

Edward Company, manufacturing jewelers at 185 Eddy Street is conducted by **Edward Dizazzo.**

Albert Hailworth of Longmeadow, Warwick, is proprietor of the **Providence Enamel Company,** 456 Fountain Street, Providence.

L. & B. Jewelry Manufacturing Company has filed notice of a change in authorized capital from $25,000 to 100 no par shares.

Austin J. Smith and **Paul T. Smith** are owners of **Quaker Plating Company,** 109 Friendship Street.

Venetian Jewelry Company, 140 Orange Street, is owned by Giovanni, Salvatore, Anthony and Mario Ficocelli and John Gautier.

A dividend on capital stock of **Nicholson File Company** has been declared, payable January 2.

American Screw Company declared a dividend of 20 cents a share, payable January 2.

W.H.M.

Middle Atlantic States

Central New York

January 2, 1934.

Aroused by what they claim is the consistent ignoring by **James H. Rand, Jr.,** president and chairman of the board of **Remington Rand, Inc.,** of letters from George J. Bowen, vice-president of the International Machinists Union, representative of the union workers, three Ilion labor unions comprising the organized employees of the local Remington plant voted to strike at a meeting held December 24. As this correspondence was mailed, the polishers and moulders had not joined the other three Ilion unions in the strike movement. Pending their action, the strike was not in effect. The purpose of the vote was to induce Mr. Rand to meet officials of the organizations involved for the purpose of discussing wages and working conditions. It was for the same purpose that Mr. Bowen's letters had been written. The labor organizations in Syracuse, Norwood, O., Middletown, Conn., and Cambridge, Mass., were also voting on whether or not to strike.

The executive board of the Ilion labor organization said that **A. M. Ross,** manager of the Ilion plant, has always met shop committees, but that the board had said "questions involved now are national ones, and involve all employees of Remington Rand; consequently they must be taken up with Mr. Rand or by someone delegated by him."

Utica Brass Works, Utica, has newly redecorated its show rooms, and reports Christmas trade was brisk.

At a conference held in Rome December 8, officials of the reorganized **Rome Company,** of which **H. T. Dyett,** is board chairman, announced that several former employees of the **General Cable Corporation** will soon become active in the Rome Company. Among these will be **Clarence R. Keeney,** former sales manager of the **Rome Wire Company; A. D. Ross Fraser, Paul Mueller** and **C A. Scott. Harry W. Barnard,** formerly of the Rome Wire and General Cable, is president of the new concern. It was announced that new line of metal beds will soon be on display in Rome. **Norman Bel Geddes,** designer for the Rome concern, also attended the conference. It is understood this company is considering the manufacture of copper wire.

Manufacture of a new and revolutionary automotive air compressor has resulted in stepping the sales volume of the **Brunner Manufacturing Company,** Utica, up to a new peak. It is made partly of bronze.

Willard D. Ackley, 64, president and general manager of the **Union Fork and Hoe Company,** died of heart trouble at his home in Utica, Christmas Eve. The factory is in Frankfort, N. Y.

E. K. B.

Newark, New Jersey

January 2, 1934.

Vice-Chancellor Berry has appointed **Herbert W. Royal** temporary receiver for the **Inkpak Pen Corporation,** fountain pen makers, 451 Jefferson Street, Orange, N. J. Insolvency was charged; assets were listed as about $3,500, while

liabilities are said to total $15,000. Directors say the company is unable to meet its bills and that the president and two officers resigned recently.

Trenton, New Jersey

January 2, 1934.

Some of the Trenton metal industries report that business is fairly good, while others that conditions are not normal.

Edgely Brass Company has been filling orders for metal grave markers.

Dudley Wilcox, Lawrenceville, N. J., has received a patent on a casting method and apparatus. C. A. L.

New Jersey Incorporations

Norton Metalcraft, Irvington; art metal products, 500 shares no par.

Harrison Brass Foundry Company, Inc., Newark.

Eastern Bronze Powder Company, Elizabeth; $125,000.

Pashelinski and Sons, Inc., Jersey City; metal products; 100 shares no par. C. A. L.

Middle Western States

Detroit, Michigan

January 2, 1934.

Industrial activity in this area stepped up briskly during the last four weeks and ended the year prepared for greater things. The NRA has done much to bring business and industry out of the distressing situation of the past year.

Pronounced changes for the better are outstanding in the motor car industry; most plants are now working on the new models. Accessory plants have also increased production. The outlook for 1934 is decidedly more encouraging.

Manufacturers of refrigeration units continue to increase production, with most encouraging prospects for the new year. This industry has made progress in spite of the handicaps of the last three years.

The plating industry has gradually improved, with the increase in automotive production. No one is operating at capacity, but most of the plants are making a fair showing from week to week.

Manufacturers of plumbing and heating supplies are not so well favored. Production is low, but the outlook is much more favorable than a year ago.

The production of vacuum cleaners has improved within the last two months. This industry has been materially affected by prevailing conditions.

Manufacturing jewelers are still marking time, hoping for a break sooner or later.

Mueller Brass Company, Port Huron, Mich., has licensed **Crane Company,** Chicago, to incorporate the Mueller's patent streamline joint on crane valves. The agreement also permits Crane to manufacture streamline fittings under Mueller patents, and provides for stocking of streamline fittings and pipe in Crane's 150 branch jobbing houses. Mueller's business on streamline copper pipe and fittings, it is stated, is already 50% greater than in 1932 at this time.

Evans Appliance Corporation, Detroit, has perfected a new aviation fuel pump. Two planes used by Admiral Richard E. Byrd on his present Antarctic expedition are equipped with four Evans pumps, and Evans pumps have been installed on about 100 United States Army planes and are approved and accepted army equipment.

Vickers, Inc., organized in Detroit in 1929, plans to occupy its new plant about Feb. 1, according to its president, **Fred J. Fisher.** Vickers manufactures pump and valve controls, stearing gear boosters, etc.

Strikes that handicapped so many automobile accessory manufacturers and drove much work to outside industrial centers, came to an end early in December. F. J. H.

Toledo, Ohio

January 2, 1934.

Industrial plants here are furnishing more employment now than they have for a number of years.

The metal and plating industries have struggled through the most distressing year of their existence here. Now comes the new year, with promise of greatly improved conditions. While no one is looking for a boom, it seems quite definite that production in most lines is due for an upturn. Automobile accessory manufacturers are starting the ball rolling. Plants have speeded up decidedly within the last two or three weeks. Most of the work, is intended for the new models, but these new models are believed to be just the beginning, with much greater things to come.

Most of the metal plants are now operating. Not all are engaged on automobile requirements, but many are, and these have promise of work for some time. Those engaged in other lines have assurance also that they will be active for quite a while.

The plating field is facing renewed activity which should continue well along into the winter.

Federal court in Toledo has granted the **Willys-Overland Company** permission to manufacture a minimum of 5,000 passenger automobiles. This number, it is stated, may yet be granted a considerable extention. At least 3,000 men seem assured of employment through February and March. At the same time Judge Hahn announced the appointment of **D. R. Wilson,** president of the **Wilson Foundry and Machine Company,** Pontiac, Mich., as temporary co-receiver to serve with **John N. Willys.** F.J.H.

Chicago, Illinois

January 2, 1934.

More than one million dollars is being spent for tools and dies by the **Auburn Automobile Company** in preparation for 1934 production, according to **W. H. Beal,** president. Production will be stepped up shortly and a large number of old workers re-employed.

Westinghouse Electric Elevator Company has a $500,000 contract for escalators for the Marshall Field store. They will be built in Chicago, starting in January.

Nash has purchased $750,000 in raw materials for the production of its new low-priced car. In December 350 men were at work on the installation of new machinery in the Racine plant; there were to be 1,000 by January 1. Additional employees will also be hired at the Nash-Seaman body plant in Milwaukee, making bodies for the new line.

Studebaker sales to dealers in November were 13 per cent greater than the combined business for November, 1929, 1931, and 1932.

Otis Elevator Company has the $60,000 contract for elevators for the new plant of Hiram Walker & Sons, Inc., Peoria, which will be the largest distillery in the world.

The bankruptcy petition of **Grigsby Grunow Company,** brought in behalf of a number of smaller creditors of the company has been denied and dismissed, and charges of collusion in the equity receivership proceedings for the company held unfounded by Federal Judge John P. Barnes.

International Harvester Company, Otis Elevator Company and Crane Company have signed up for individual buildings for the new 1934 **Century of Progress Exposition.** Among others who will have important exhibits are the Kohler Company and Alemite.

James E. Otis, executive vice president of the **Stewart-Warner Corporation,** has been elected a director and executive committee member to fill the vacancy caused by the resignation of **C. B. Smith,** former president. **V. P. Bucklin,** vice president, treasurer, and executive committee member, and **L. H. LaChance,** former board chairman of the company and president of its subsidiary, the **Stewart Die Casting Corporation,** have resigned all of their official positions with Stewart-Warner and subsidiaries, except their positions as directors.

Container Company of America, Walter P. Paepke, president, will modernize equipment at two Chicago plants.

W. A. Nugent, formerly district manager for the Chicago territory, has been appointed sales manager of **Independent Pneumatic Tool Company.** R. G. K.

Pacific States

Los Angeles, Calif.

January 2, 1934.

R. G. Spillsbury, research engineer of the **Anaconda Copper Company** and the **American Brass Company,** its subsidiary, has recently covered the far west and reports taking orders for about 28 millions pounds of copper, with tentative orders for 60 millions pounds more. New uses are expanding consumption of the red metal, he says, mentioning its use for rustproofing in marine work, roofing, copper wire cloth awnings, cable coating, etc.

Union Pacific Railroad is exhibiting the model of a new streamlined train it is having built for use on the Chicago-Los Angeles run, where it will go 110 miles an hour. The cars are of aluminum alloy, reducing weight greatly as compared with steel. Complete air conditioning will allow sealing of all windows. Pullman is building it.

Murray Steel Products Company has been organized at Hollywood by **James R. Murray,** former auto body builder of Detroit, Mich. Firm will make bakers' utensils, stampings, and tinware for 10 cent store trade.

P. M. Chancellor and **L. H. Roos** have established at North Orange Grove Avenue, Burbank, Calif., to manufacture a highly specialized line of surgical and other instruments.

Chrysler has added a 900-foot assembly line at the Los Angeles plant, and expanded production in finishing of bodies of parts by painting, spraying, lacquering, etc. The plant may also go into aeronautic production.

Palmer Radiator and Body Works, 580 South Boyle Avenue, is a new branch of the main factory at Phoenix, Ariz., and will manufacture a new type of office and residential cooling unit of copper. **O. C. Palmer** is president.

Mototoy Manufacturing Company, Melrose Avenue, has established to make toy gas motors of aluminum which will lift a model airplane off the ground. **F. S. McFarland** is president.

Clarence Stalcup, Arcadia, Calif., has established a small shop for making an automatic shut-off valve for gas meters which he invented.

Food Machinery Corporation which has plants at Riverside, Anaheim and Los Angeles, has bought the **Peerless Pump Company,** 67th and Alameda Streets, Los Angeles, and will continue its pump business there. **Vernon Elder** is president. Firm also has plant at Massillon, Ohio.

Paxon Nailing Machine Company has bought site at Santa Ana and will move its plant from Sanger. H. S.

Metal Market Review

The Past Year

January 2, 1934.

The year 1933 was a better one, on the whole, than the preceding twelve months in the metal markets. There were increases in consumption of copper, zinc, lead and some of the other metals, and the price situation in every department was better at the end of the year than it had been at the opening. Copper, which began 1933 at the all time low of 5 cents went as high as 9 cents at one time, and ended the year at 8¼ cents. Lead and zinc, which began the year at 3 and 3.12½ cents per pound, respectively, emerged into 1934 at respective levels of 4.15 and 4.37½ cents. Straits tin rose from 22½ cents in January, 1933, to a present price of well over 50 cents. Virgin aluminum and nickel showed no fluctuation whatever. Antimony went up from the 5½ cents of last January to a December average of 7.30 cents. Silver, which opened the year at less than 25 cents an ounce, is now very strong at over 43 cents. Platinum climbed from $28 an ounce in January to $38 in December.

The metals seem to be slowly but surely climbing out of the depression. This has engendered a considerable amount of confidence in the trade, an element which was distinctly lacking a year ago. While no excess of activity is expected in the very near future, the metal trades have now at least ironed out most of their code difficulties, and are able to keep a sharp eye out for any bright spots that appear on the horizon.

Among the factors which tend to produce optimism among metal producers and sellers are decreases in the surplus stocks of several of the major metals, due to increases in deliveries for consumption, together with production control. During the year deliveries of copper for consumption amounted to 390,000 short tons, as against 336,000 in 1932, a gain of 16 per cent; lead deliveries were 346,000 tons, against 317,250 in 1932, or 9 per cent higher; zinc deliveries went up about 56 per cent to 340,000 tons in 1933, compared with 218,400 tons in 1932. Invisible supplies of copper and lead were reported smaller at the year-end, which indicates that actual consumption was somewhat larger than the shipments.

The tin producers (the United States produces practically no tin) benefitted by their rigidly maintained program of production restriction, cutting the surplus stocks materially during the year. The agreement has been renewed for another year, which points to continued strength of the market insofar as supply affects it.

The silver market was fairly strong throughout the year, largely because of political and governmental consideration of the metal in relation to currencies, and resultant speculation. It has moved considerably higher in the past few months, and the announcement of the Government's intention of purchasing practically the whole United States output of newly mined silver at 64½ cents an ounce adds to the strength of the market.

Platinum and its related metals have gained much from the restrictions placed upon gold by the Government. World consumption of all platinum metals for 1933 is placed at approximately 175,000 ounces, which compares with about 75,000 ounces for 1932. A good deal of this metal went into industrial use, mainly in the chemical lines, which picked up considerably last year. Other developments occurred as well. Palladium was used considerably as a substitute for white gold in dentistry and jewelry, and also in the electrical lines. In the form of leaf it has been put to a number of decorative uses, including decoration of women's shoes, picture frames, for window lettering and in other places where gold has hitherto held sway. A complete after-dinner coffee service of iridio-platinum was designed and executed by Tiffany and Company, while Cartier, Inc., produced a lady's dresser set in this alloy as well as a platinum and crystal trophy; these creations were all displayed at the Century of Progress at Chicago.

Reviews of significant developments during 1933 in all the major metals and in related fields which consume metals will be found toward the front of this issue.

December Markets

December witnessed no material changes in the metal markets. The average prices as compared with the preceding month were all slightly higher, in line with the general upward movement of commodity prices under inflationary and other Governmental stimulation.

Brass Ingot Statistics

On December 1, unfilled orders from brass and bronze ingots and billets on the books of the members of the Non-Ferrous Ingot Metal Institute, Chicago, Ill., amounted to a total of 13,465 net tons, as compared with 13,678 tons November 1.

The combined deliveries of brass and bronze ingots and billets by the members of the Institute for November amounted to 2,663 tons, as compared

with 3,746 tons delivered in October.

Average prices per pound received by the Institute members on commercial grades of six principal mixtures of ingot brass during the twenty-eight day period ending December 29, 1933, are as follows, with comparative prices reported for the period ended December 1:

Grade	28 Days Ended Dec. 29	Dec. 1
Commercial 80-10-10 .	9.820c	9.748c
Commercial 78%	7.548c	7.751c
Commercial 81%	7.751c	8.006c
Commercial 83%	8.001c	8.349c
Commercial 85-5-5-5 .	8.271c	8.582c
Com. No. 1 yellow ..	6.507c	6.867c

The Wrought Metal Market

Review of the Year

January 2, 1934.

The expansion of manufacturing activity over the latter part of 1933 was naturally accompanied by an improvement in the wrought metal business. In all its branches the metal business has been rebounding from the very low level of activity which obtained when 1933 began. Prominent factors in this increased activity have been the gains in manufacture of motor vehicles, refrigeration units, vacuum cleaners and many other products. With the electrical industry's bookings far ahead of a year ago, the prospects for consumption of copper in various forms are definitely better.

The year was marked by a number of outside influences which had their bearing on fabricated metals. The Century of Progress Exposition at Chicago gave nonferrous metals a very prominent place; other developments included substitution of light alloys for steel or wood in transportation; the furtherance of plans for fabricating dwellings of all or part metal; the legalization of 3.2 beer and, later, the repeal of prohibition; Government aid to construction; advances in the application of air conditioning to homes and commercial buildings; the beginning of the Tennessee Valley Authority's project for providing cheap power to a very large area of consumption, which will mean eventual purchase of much agricultural, industrial and domestic electrical equipment. The electrical industry has already begun to look into the possibilities opened up by the last named project, and whatever success they have will be promptly reflected in consumption of fabricated metals and in various types of metal finishing.

The producers and distributors of wrought metals have nearly all come to satisfactory terms in the matter of codes of fair competition.

The coming year is expected to see no relaxation in the efforts of the various producing groups to foster the use of their metals. This will aid the distributor and the small manufacturer whose interests are closely coupled with the nonferrous lines.

The leading articles in this issue deal with more specific developments having a direct bearing on the wrought metal markets.

December

Wrought metal prices underwent a number of sudden changes last month, when the code affecting the copper and brass fabricators went into effect. American Brass and Revere each issued price lists which at first showed some variation in prices for the same products. These lists were afterward withdrawn, and new lists have been issued in which the differences were apparently eliminated. The copper and brass mill products list on the page opposite represents the present quotations of the American Brass Company, and is subject to a somewhat complex system of discounts, extras, scrap allowances, etc. The net result has been a slight decline from the prices on the old list, which is in line with the somewhat lower price of raw copper now prevailing.

There were no changes in basic quotations on aluminum, nickel, zinc, tin or lead products in rolled or drawn forms. Silver products were subject to fluctuation due to the state of the bar silver market, as were some of the other rare metal alloys.

Aluminum Protection. A report from Berlin states that the increase in corrosion resistance of light-metal objects, especially those made of aluminum and magnesium and their alloys, the resistance of which depends on the formation of an oxide film on the surface, may be materially improved by exposing these metals to the action of ammonia vapors, according to investigations by Erft-Werke A-G., Grevenbroich, Germany. An increase in weight of the treated objects is attained at the same time.

Daily Metal Prices for December, 1933

Record of Daily, Highest, Lowest and Average Prices and the Customs Duties

	1	4	5	6	7	8	11	12	13	14	15	18
Copper c/lb.												
Lake (Del. Conn. Producers' Prices)	8.125	8.125	8.125	8.125	8.125	8.125	8.125	8.125	8.125	8.125	8.125	8.375
Electrolytic (Conn. Producers' Prices)	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.25
Casting (f.o.b. ref.)	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	8.00
Zinc (f.o.b. East St. L.) c/lb.												
Prime Western (for Brass Special add 0.05)	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Tin (f.o.b. N.Y.) c/lb., Straits	53.50	53.00	53.375	52.70	52.50	53.25	53.00	52.35	52.35	53.00	53.00	53.35
Lead (f.o.b. St. L.) c/lb.	3.95	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05
Aluminum c/lb.	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Nickel c/lb., Electrolytic 99.9%	35	35	35	35	35	35	35	35	35	35	35	35
Antimony (Ch. 99%) c/lb.	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25
Silver c/oz. Troy	43.75	43.125	43.625	43.625	43.625	43.25	43.50	42.75	42.50	43.25	43.50	43.625
Platinum $/oz. Troy	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00
Gold—R. F. C. Official Price—$/oz. Troy	34.01	34.01	34.01	34.01	34.01	34.01	34.01	34.01	34.01	34.01	34.01	34.06

	19	20	21	22	*25	26	27	28	29	High	Low	Aver.
Copper c/lb.												
Lake (Del. Conn. Producers' Prices)	8.50	8.50	8.375	8.375	...	8.375	8.375	8.375	8.375	8.50	8.00	8.187
Electrolytic (Conn. Producers' Prices)	8.375	8.375	8.25	8.25	...	8.25	8.25	8.25	8.25	8.375	8.00	8.125
Casting (f.o.b. ref.)	8.125	8.125	8.00	8.00	...	8.00	8.00	8.00	8.00	8.125	7.625	7.869
Zinc (f.o.b. East St. L.) c/lb.												
Prime Western (for Brass Special add 0.05)	4.50	4.45	4.45	4.45	...	4.45	4.40	4.40	4.35	4.50	4.35	4.470
Tin (f.o.b. N.Y.) c/lb., Straits	53.125	52.625	52.35	52.80	...	53.30	52.70	52.60	52.60	53.50	52.35	52.875
Lead (f.o.b. St. L.) c/lb.	4.05	4.05	4.05	4.05	...	4.05	4.05	4.05	4.05	4.05	3.95	4.042
Aluminum c/lb.	23.30	23.30	23.30	23.30	...	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Nickel c/lb., Electrolytic 99.9%	35	35	35	35	...	35	35	35	35	35	35	35
Antimony (Ch. 99%) c/lb.	7.20	7.15	7.10	7.30	...	7.30	7.30	7.30	7.30	7.30	7.10	7.241
Silver c/oz. Troy	43.50	43.00	43.00	44.25	...	43.50	43.75	44.375	44.375	44.625	42.50	43.550
Platinum $/oz. Troy	38.00	38.00	38.00	38.00	...	38.00	38.00	38.00	38.00	38.00	37.00	37.50
Gold—R. F. C. Official Price—$/oz. Troy	34.06	34.06	34.06	34.06	...	34.06	34.06	34.06	34.06	34.06	34.01	34.033

*Holiday.

Metal Prices, January 8, 1934

(Import duties and taxes under U. S. Tariff Act of 1930, and Revenue Act of 1932)

NEW METALS

Copper: Lake, 8.375, Electrolytic, 8.25, Casting, 8.00.
Zinc: Prime Western, 4.25. Brass Special, 4.60.
Tin: Straits, 51.85. Pig 99%, 50.00.
Lead: 3.90. **Aluminum,** 23.30. **Antimony,** 7.25.
Nickel: Ingot, 35. Shot, 36. Elec., 35. Pellets, 40.
Quicksilver: Flasks, 75 lbs., $69.50. **Bismuth,** $1.30.
Cadmium, 55. **Silver,** Troy oz., official price, N. Y., Jan. 9, 43.75. **Gold:** oz., Troy, Official U. S. Treasury price December 4, $34.01.
Platinum, oz. Troy, $38.00.

Duties: Copper, 4c. lb.; zinc, 1¼c. lb.; tin, free; lead, 2½c. lb.; aluminum, 4c. lb.; antimony, 2c. lb.; nickel, 3c. lb.; quicksilver, 25c. lb.; bismuth, 7½%; cadmium, 15c. lb.; cobalt, free; silver, free; gold, free; platinum, free.

INGOT METALS AND ALLOYS

	Cents lb.	Duty	U. S. Import Tax*
Brass Ingots, Yellow	6½ to 8	None	4c. lb.[1]
Brass Ingots, Red	8¼ to 10½	do	do
Bronze Ingots	9 to 11½	do	do
Aluminum Casting Alloys	13 to 22	4c. lb.	None
Manganese Bronze Castings	20 to 34	45% a. v.	3c. lb.[2]
Manganese Bronze Forgings	26 to 38	do	do
Manganese Bronze Ingots	10 to 13	do	4c. lb.[1]
Manganese Copper, 30%	11½ to 16	25% a. v.	3c. lb.[2]
Monel Metal Shot or Block	28	do	None
Phosphor Bronze Ingots	9 to 12	None	4c. lb.[1]
Phosphor Copper, guaranteed 15%	12¼ to 15	3c. lb.[2]	do
Phosphor Copper, guaranteed 10%	11¼ to 14	do	do
Phosphor Tin, no guarantee	61 to 75	None	None
Silicon Copper, 10%	18 to 30	45% a. v.	4c. lb.[1]
Iridium Platinum, 5%	$39.25	None	None
Iridium Platinum, 10%	$40.50	None	None

*Duty is under U. S. Tariff Act of 1930; tax under Section 60 (7) of Revenue Act of 1932.
[1]On copper content. [2]On total weight. "a. v." means ad valorem.

OLD METALS

Dealers' buying prices, wholesale quantities:	Cents lb.	Duty	U. S. Import Tax
Heavy copper and wire, mixed	6⅛ to 6⅜	Free	4c. per pound on copper content.
Light copper	5⅜ to 5⅝	Free	
Heavy yellow brass	3½ to 3¾	Free	
Light brass	2⅞ to 3⅛	Free	
No. 1 composition	4⅞ to 5⅛	Free	
Composition turnings	4⅝ to 4⅞	Free	
Heavy soft lead	3 to 3¼	2⅛c. lb.	None.
Old zinc	2½ to 2¾	1½c. lb.	
New zinc clips	3¼ to 3½	1½c. lb.	
Aluminum clips (new, soft)	13½ to 14½	4c. lb.	
Scrap aluminum, cast, mixed	7½ to 9	4c. lb.	
Aluminum borings—turnings	4½ to 5	4c. lb.	
No. 1 pewter	30 to 32	Free	
Electrotype or stereotype	3 to 3¼	2⅛c. lb.*	
Nickel anodes	31½ to 33½	10%	
Nickel clips, new	33½ to 35½	10%	
Monel scrap	11½ to 18	10% a.v.	

*On lead content.

Wrought Metals and Alloys

The following are net BASE PRICES per pound, to which must be added extras for size, shape, quantity, packing, etc., or discounts, as shown in manufacturers' price lists, effective since December 19, 1933.

COPPER MATERIAL

	Net base per lb.	Duty*
Sheet, hot rolled	15c.	2½c. lb.
Bare wire, soft, less than carloads	12.25c.	25% a. v.
Seamless tubing	16¼c.	7c. lb.

*Each of the above subject to import tax of 4c. lb. in addition to duty, under Revenue Act of 1932.

NICKEL SILVER

Net base prices per lb. (Duty 30% ad valorem.)

Sheet Metal		Wire and Rod	
10% Quality	23 c.	10% Quality	25⅞c.
15% Quality	25⅛c.	15% Quality	30¼c.
18% Quality	26⅜c.	18% Quality	33½c.

BRASS AND BRONZE MATERIAL

Net base prices per pound, mill shipments.

	High Brass	Low Brass	Bronze	Duty	U. S. Import Tax
Sheet	13¾c.	14⅞c.	15¼	4c. lb.	4c. lb on copper content
Wire	14¼c.	15⅜c.	15¾	25%	
Rod	12¼c.	15⅜c.	15⅝	4c. lb.	
Angles, channels.	21¾c.		23¼	12c. lb.	
Seamless tubing.	16¼c.		17⅞	8c. lb.	
Open seam tubing	21¾c.		23¼	20% a. v.	No tax.

TOBIN BRONZE AND MUNTZ METAL

(Duty 4c. lb.; import tax 4c. lb. on copper content.)

Net base prices per pound.	
Tobin Bronze Rod	15¾c.
Muntz or Yellow Rectangular and other sheathing	16⅞c.
Muntz or Yellow Metal Rod	13¼c.

ALUMINUM SHEET AND COIL

(Duty 7c. per lb.)

Aluminum sheet, 18 ga., base, ton lots, per lb.	32.80
Aluminum coils, 24 ga., base price, tons lots, per lb.	30.50

ROLLED NICKEL SHEET AND ROD

(Duty 25% ad valorem, plus 10% if cold worked.)

Net Base Prices

Cold Drawn Rods	50c.	Cold Rolled Sheet	60c.
Hot Rolled Rods	45c.	Full Finished Sheet	52c.

MONEL METAL SHEET AND ROD

(Duty 25% ad valorem, plus 10% if cold worked.)

Hot Rolled Rods (base)	35	Full Finished Sheets (base)	42
Cold Drawn Rods (base)	40	Cold Rolled Sheets (base)	50

SILVER SHEET

Rolled sterling silver (January 9) 47.00c. per Troy oz. upward according to quantity.. (Duty, 65% ad valorem.)

ZINC AND LEAD SHEET

	Cents per lb. Net Base	Duty
Zinc sheet, carload lots, standard sizes and gauges, at mill, less 7 per cent discount	9.50	2c. lb.
Zinc sheet, full casks (jobbers' price)	9.75	2c. lb.
Zinc sheet, open casks (jobbers' price)	10.50 to 10.75	2c. lb.
Full Lead Sheet (base price)	7.75	2½c. lb.
Cut Lead Sheet (base price)	8.00	2½c. lb.

BLOCK TIN, PEWTER AND BRITANNIA SHEET

(Duty free)

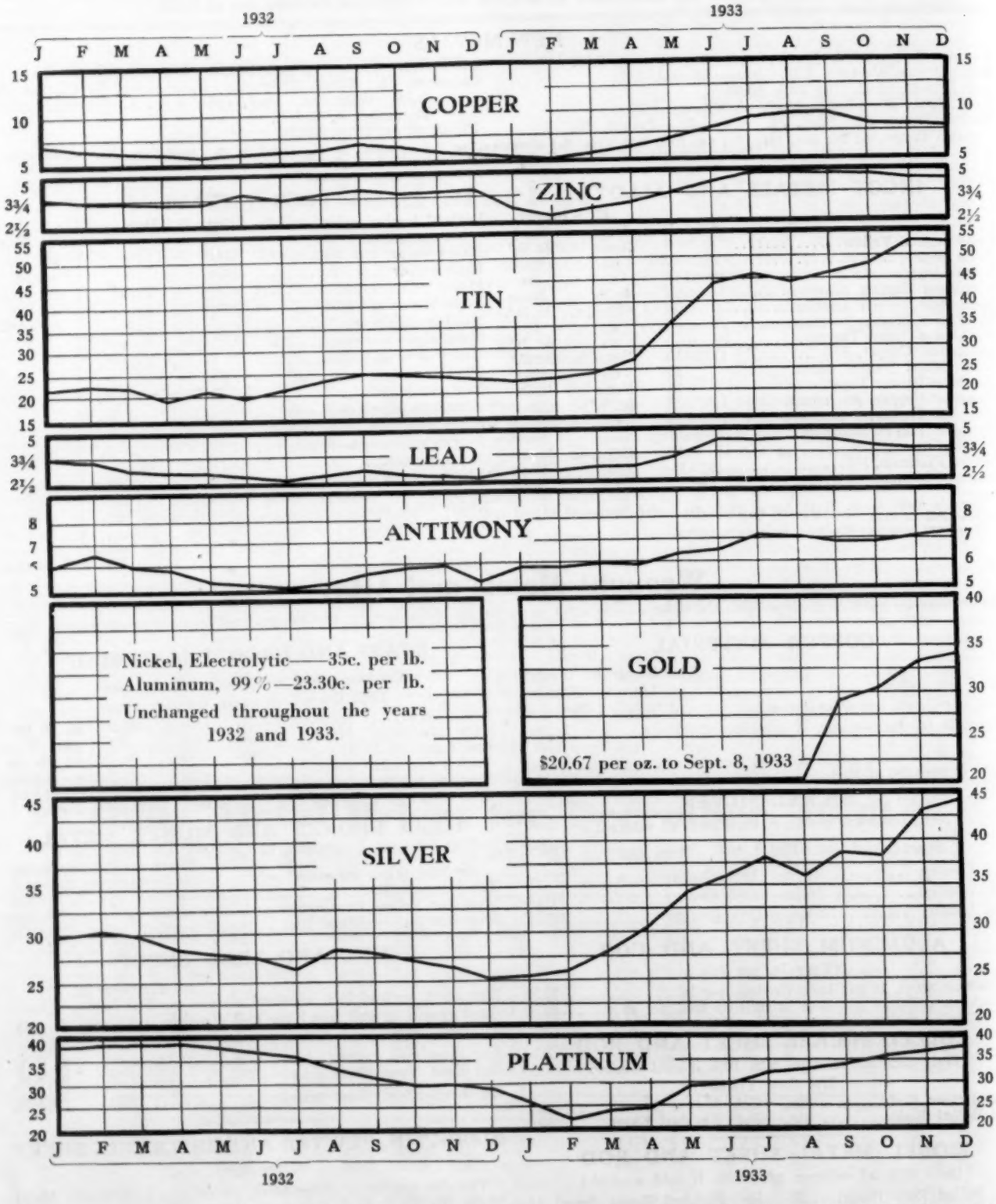
This list applies to either block tin or No. 1 Britannia Metal Sheet, No. 23 B. & S. Gauge, 18 inches wide or less; prices are all f. o. b. mill:

500 lbs. or over	15c. above N. Y. pig tin price
100 to 500 lbs.	17c. above N. Y. pig tin price
Up to 100 lbs.	25c. above N. Y. pig tin price

Lighter gauges command "extras" over the above prices.

Supply Prices on page 42

Chart of Metal Prices for 1932-1933



NOTE:—Prices shown on left and right edges of chart are in cents per pound, except for silver which is in cents per troy ounce, and gold and platinum which are in dollars per Troy ounce.

Supply Prices—Page 42

Pig Iron and Metal Production of the United States

Calendar Years 1923-1932. (1933 Estimated)

(FIGURES THROUGH 1932 FROM THE UNITED STATES BUREAU OF MINES)

PRODUCTS METALLIC	1924 Quantity	1924 Value	1925 Quantity	1925 Value	1926 Quantity	1926 Value	Products
Pig iron (spot value), long tons	31,064,129	$665,078,972	36,814,702	$739,316,333	38,181,053	$749,633,468	Pig iron
Copper, sales value, pounds	1,634,249,192	214,087,000	1,674,869,886	237,832,000	1,739,622,094	243,547,000	Copper
Zinc, sales value, short tons	515,831	67,058,000	555,631	84,456,000	611,991	91,799,000	Zinc
Tin, short tons	7	7,028	14	15,980	8	10,400	Tin
Lead (ref.) sales value, short tons	566,407	90,625,000	654,921	113,956,000	680,685	108,910,000	Lead
Aluminum, pounds	150,000,000	36,607,000	140,000,000	36,430,000	145,000,000	37,583,000	Aluminum
Nickel, value at New York, short tons	191	114,903	272	169,664	323	234,558	Nickel
Quicksilver, value at N.Y., †flasks (e)	10,085	692,739	9,174	762,616	7,642	702,323	Quicksilver
Antimonial lead, short tons (F.&D.)	20,787	3,376,713	19,667	3,785,547	22,524	3,916,714	Antim. Lead
Silver, commercial value, troy ounces	65,407,186	43,822,814	66,155,424	45,911,864	62,718,746	39,136,497	Silver
Gold, coining value, troy ounces	2,528,900	52,277,000	2,411,987	49,860,200	2,335,042	48,269,600	Gold
Platinum and allied metals, value at New York City, in troy ounces	66,007	7,611,319	49,643	5,661,809	84,981	9,210,669	Platinum
Total value of metallic products (approximate) (b)		$1,232,330,000		$1,380,280,000		$1,402,920,000	

PRODUCTS METALLIC	1927 Quantity	1927 Value	1928 Quantity	1928 Value	1929 Quantity	1929 Value	Products
Pig iron (spot value), long tons	34,866,644	$646,226,139	38,303,699	$661,351,270	41,549,161	$731,858,075	Pig iron
Copper, sales value, pounds	1,684,040,983	220,609,000	1,825,900,393	262,930,000	2,002,863,135	352,504,000	Copper
Zinc, sales value, short tons	576,960	73,851,000	591,525	72,166,000	612,136	80,802,000	Zinc
Tin, short tons	27	34,600	47	47,400	39	35,600	Tin
Lead (ref.) sales value, short tons	668,320	84,208,000	626,202	72,639,000	672,498	84,735,000	Lead
Aluminum, pounds	160,000,000	39,266,000	210,000,000	47,899,000	225,000,000	51,864,000	Aluminum
Nickel, value at New York, short tons	860	390,740	522	291,836	340	297,273	Nickel
Quicksilver, value at N. Y., flasks (e)	11,276	1,314,782	17,870	2,207,003	23,682	2,892,638	Quicksilver
Antimonial lead, short tons (F.&D.)	24,347	3,277,043	33,058	3,978,318	25,669	3,267,095	Antim. Lead
Silver, commercial value, troy ounces	60,434,441	34,266,328	58,462,507	34,200,567	61,327,868	32,687,754	Silver
Gold, coining value, troy ounces	2,197,125	45,418,600	2,233,251	46,165,400	2,208,386	45,651,400	Gold
Platinum and allied metals, value at New York City, in troy ounces	46,050	3,780,216	59,039	4,692,786	47,977	3,121,471	Platinum
Total value of metallic products (approximate) (b)		$1,217,000,000		$1,284,580,000		$1,475,990,000	

PRODUCTS METALLIC	1930 Quantity	1930 Value	1931 Quantity	1931 Value	1932 Quantity	1932 Value	Products
Pig iron (spot value), long tons	29,905,355	$512,165,131	17,812,579	$285,147,156	8,518,400	$126,032,714	Pig iron
Copper, sales value, pounds	1,394,389,327	181,271,000	1,042,711,178	94,887,000	544,009,948	34,273,000	Copper
Zinc, sales value, short tons	489,361	46,979,000	291,996	22,192,000	207,148	12,429,000	Zinc
Tin, short tons	17	10,500	4.1	2,050	0.5	220	Tin
Lead (ref.) sales value, short tons	573,740	57,374,000	390,260	28,879,000	255,337	15,320,000	Lead
Aluminum, pounds	229,035,000	50,961,000	177,544,000	37,284,000	104,885,000	20,453,000	Aluminum
Nickel, value at New York, short tons	308	213,803	373	202,406	195	88,515	Nickel
Quicksilver, value at N. Y., flasks (e)	21,533	2,478,789	24,947	2,179,145	12,622	731,129	Quicksilver
Antimonial lead, short tons (F.&D.)	13,711	1,392,524	(f)	(f)	(f)	(f)	Antim. Lead
Silver, commercial value, troy ounces	50,748,127	19,538,029	30,932,050	8,970,294	23,980,773	6,762,578	Silver
Gold, coining value, troy ounces	2,285,603	47,247,600	2,395,878	49,527,200	2,449,032	50,626,000	Gold
Platinum and allied metals, value at New York City, in troy ounces	43,502	2,048,824	36,205	1,274,029	17,616	591,849	Platinum
Total value of metallic products (approximate) (b)		$982,550,000		$567,200,000		$283,700,000	

ESTIMATES OF UNITED STATES PRODUCTION FOR 1933	Quantity	Value Total	Value Per Unit
Pig iron (spot value) long tons	13,208,190	$215,293,500	$16.30 ton (a)
Copper, sales value, short tons	320,000	46,400,000	7.25c. lb. (c)
Zinc, sales value, short tons	324,687	26,170,000	4.03c. lb. (d)
Tin (U. S. deliveries) long tons	57,815	50,662,000	39.12c. lb. (g)
Lead (pig,) sales value, short tons	363,000	27,116,100	3.735 lb. (d)
Aluminum, short tons	*	*	*
Silver, troy ounces, at N. Y. official price average	21,400,000	7,431,500	34.727c. oz.
Gold, troy ounces	250,000,000	*	*

(a) Composite average; used as basis of total output value also.

(b) Includes some items of minor interest to metal trades not shown in table. (c) Del. Conn. Valley. (d) E. St. Louis.

†At San Francisco through 1924; N. Y. thereafter.

(e) For years 1920 to 1927, inclusive, mercury reported by the Bureau of Mines in flasks of 75 pounds; for 1928 and succeeding years, in flasks of 76 pounds.

(f) No longer calculated separately. (g) Spot Straits average.

*Figures unavailable at date of issue.

Supply Prices, January 8, 1934

ANODES

Prices, except silver, are per lb. f.o.b., shipping point, based on purchases of 500 lbs. or more, and subject to changes due to fluctuating metal markets.

Copper: Cast ..... 17¼c. per lb.
Electrolytic, full size, 13¼c.; cut to size, 13½c. per lb.
Rolled oval, straight, 15¼c.; curved, 16¼c. per lb.
Brass: Cast ..... 16¼c. per lb.
Zinc: Cast ..... 9c. per lb.

Nickel: 90-92% ..... 44c. per lb.
95-97% ..... 45c. per lb.
99%+cast, 47c.; rolled, depolarized, 48c.
Silver: Rolled silver anodes .999 fine were quoted Jan. 9, from 47.00c. per Troy ounce upward, depending upon quantity.

WHITE SPANISH FELT POLISHING WHEELS

Diameter	Thickness	Under 50 lbs.	50 to 100 lbs.	Over 100 lbs.
10-12-14 & 16	1" to 2"	$2.95/lb.	$2.65/lb.	$2.45/lb.
10-12-14 & 16	2 to 3½	2.85	2.55	2.35
6-8 & over 16	1 to 2	3.05	2.75	2.55
6-8 & over 16	2 to 3½	3.00	2.70	2.45
6 to 24	Under ½	4.25	3.95	3.75
6 to 24	½ to 1	3.95	3.65	3.45
6 to 24	Over 3½	3.35	3.05	2.85

Any Quantity

4 to 6	Under ½, $5.00	½-1, $4.85	1 to 3, $4.75
1½ to 4	" 5.55	" 5.40	" 5.35
1 to ½	" 5.85	" 5.70	" 5.60

Extras: 25c per lb. on wheels, 1 to 6 in. diam., over 3 in. thick.
On grey Mexican wheels deduct 10c. per lb. from above prices.

COTTON BUFFS

Full disc open buffs, per 100 sections when purchased in lots of 100 or less were quoted December 1:

14" 20 ply 84/92 Unbleached	$57.30-70.96
11" 20 ply 84/92 Unbleached	39.15-48.48
14" 20 ply 80/92 Unbleached	45.95-56.90
11" 20 ply 80/92 Unbleached	31.50-39.01
14" 20 ply 64/68 Unbleached	42.45-52.57
11" 20 ply 64/68 Unbleached	29.14-36.09
Sewed Pieced Buffs, per lb., bleached	40c. to 1.09

CHEMICALS

These are manufacturers' quantity prices and based on delivery from New York City.

Acetone	lb.	.10½-.11½
Acid—Boric (Boracic) granular, 99½+% ton lots	lb.	.04½-.05
Chromic, 75 to 400 lb. drums	lb.	.15-.15¼
Hydrochloric (Muriatic) Tech., 20 deg., carboys	lb.	.02
Hydrochloric, C. P., 20 deg., carboys	lb.	.06
Hydrofluoric, 30%, bbls.	lb.	.08-.12
Nitric, 36 deg., carboys	lb.	.06-.06½
Nitric, 42 deg., carboys	lb.	.07-.08
Sulphuric, 66 deg., carboys	lb.	.02
Alcohol—Butyl	lb.	.095-.11
Denatured drums	gal.	.475-.476
Alum—Lump, barrels	lb.	.03¼-.04
Powdered, barrels	lb.	.03½-.05
Ammonia, aqua, com'l., 26 deg., drums, carboys	lb.	.02¾-.05
Ammonium—Sulphate, tech., bbls.	lb.	.03½-.05
Sulphocyanide, technical crystals	lb.	.42
Arsenic, white, kegs	lb.	.04½-.05
Asphaltum	lb.	.35
Benzol, pure	gal.	.58
Borax, granular, 99½+%, ton lots	lb.	.02¼-.02¾
Cadmium oxide, 50 to 1,000 lbs.	lb.	.55
Calcium Carbonate (Precipitated Chalk)	lb.	.05¾-.07½
Carbon Bisulphide, drums	lb.	.06-.12
Chrome Green, bbls.	lb.	.22
Chromic Sulphate	lb.	.33-.55
Copper—Acetate (Verdigris)	lb.	.23
Carbonate, bbls.	lb.	.15-.18
Cyanide (100 lb. kgs.)	lb.	.39
Sulphate, bbls.	lb.	4.45
Cream of Tartar Crystals (Potassium Bitartrate)	lb.	.20¼-.20½
Crocus	lb.	.15
Dextrin	lb.	.05-.08
Emery Flour	lb.	.06
Flint, powdered	ton	$30.00
Fluorspar, bags	lb.	.03½
Gold Chloride	Price subject to gold price fluctuations.	
Gum—Sandarac	lb.	.26
Shellac	lb.	.32-.34
Iron Sulphate (Copperas), bbls.	lb.	.01½
Lacquer Solvents	gal.	.85
Lead—Acetate (Sugar of Lead)	lb.	.10-13½
Yellow Oxide (Litharge)	lb.	.12½
Mercury Bichloride (Corrosive Sublimate)	lb.	$1.58
Methanol, 100% synth., drums	gal.	.42½
Nickel—Carbonate, dry, bbls.	lb.	.35-.41
Chloride, bbls.	lb.	.18-.22
Salts, single, 300 and 425 lb. bbls.	lb.	.12-.13
Salts, double, 425 lb. bbls.	lb.	.12-.13
Paraffin	lb.	.05-.06
Phosphorus—Duty free, according to quantity	lb.	.35-.40
Potash Caustic Electrolytic 88-92% broken, drums	lb.	.08-.093
Potassium—Bichromate, casks (crystals)	lb.	.08⅝
Carbonate, 96-98%	lb.	.08¾
Cyanide, 165 lbs. cases, 94-96%	lb.	.57½
Pumice, ground, bbls.	lb.	.02½
Quartz, powdered	ton	$30.00
Rosin, bbls.	lb.	.04½
Rouge—Nickel, 100 lb. lots	lb.	.25
Silver and Gold	lb.	.65
Sal Ammoniac (Ammonium Chloride) in bbls.	lb.	.05-.05½
Silver—Chloride, dry, 100 oz. lots	Prices subject to rapid fluctuations of silver market.	
Cyanide		
Nitrate 100 ounce lots		
Soda Ash, 58%, bbls.	lb.	.0252
Sodium—Cyanide, 96 to 98%, 100 lbs.	lb.	.16½-.22
Beryllium fluoride ($2NaF.BeF_2$)	lb.	4.30-7.00
Hyposulphite, kegs, bbls.	lb.	.03½-.06½
Metasilicate, granular, bbls.	lb.	3.55-3.70
Nitrate, tech., bbls.	lb.	.03¼-.07
Phosphate, tech., bbls.	lb.	.03¾
Silicate (Water Glass), bbls.	lb.	.01½
Stannate, fluctuating	lb.	.40
Sulphocyanide	lb.	.30-.45
Sulphur (Brimstone), bbls.	lb.	.02
Tin Chloride, fluctuating, 100 lb. kegs	lb.	.39
Tripoli, powdered	lb.	.03
Wax—Bees, white, ref. bleached	lb.	.60
Yellow, No. 1	lb.	.45
Whiting, Bolted	lb.	.02½-.06
Zinc—Carbonate, bbls.	lb.	.11-.12
Chloride, drums, bbls.	lb.	.07½-.10
Cyanide (100 lb. kegs)	lb.	.38
Sulphate, bbls.	lb.	.03½